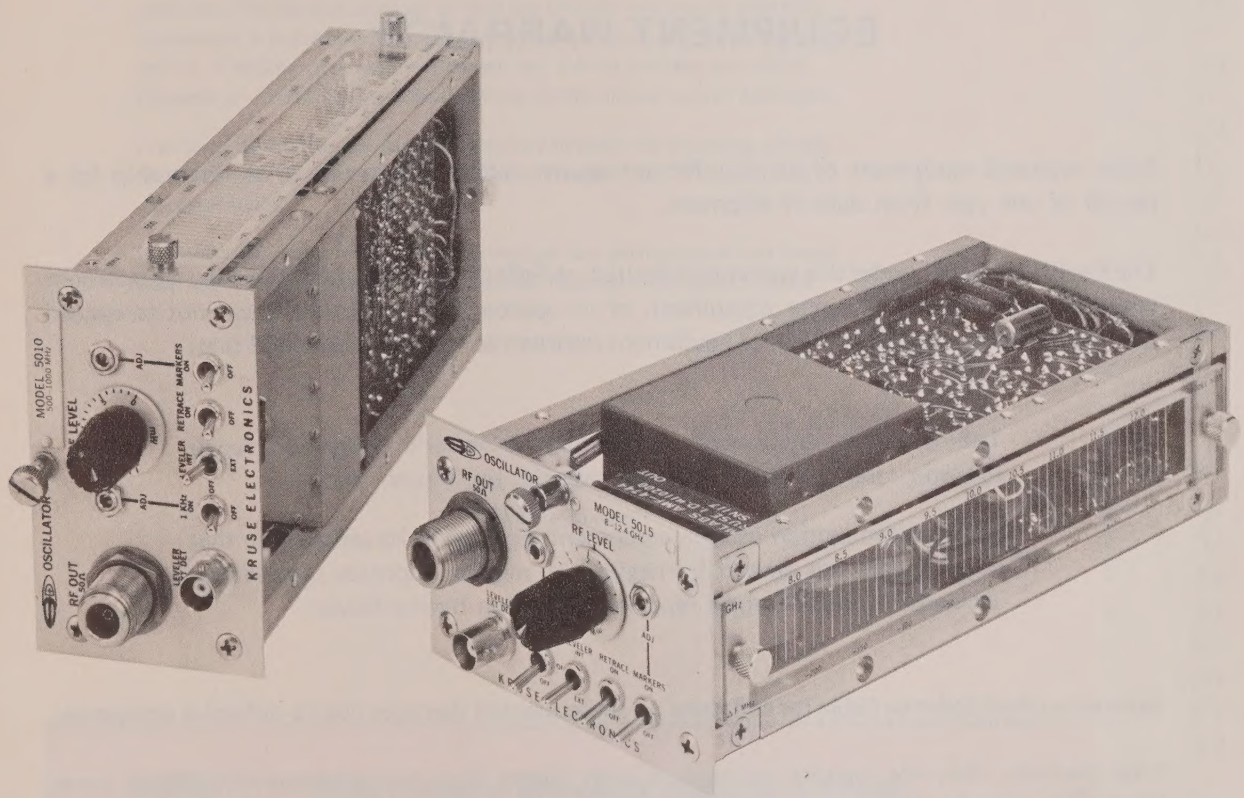
SYSTRON DONNER

OPERATION AND SERVICE MANUAL



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SYSTRON DONNER CORPORATION
ONE SYSTRON DRIVE
CONCORD, CALIFORNIA 94518 USA

MODEL 5000 SERIES

RF PLUG-INS

MICROWAVE DIVISION
SYSTRON DONNER CORPORATION
INSTRUMENT GROUP

PRINTED **8-1-76**
MANUAL P/N **950784**

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SECTION 1

INTRODUCTION AND DESCRIPTION

1.1 SCOPE OF MANUAL

This manual is supplied to provide operating information, specifications, and schematic diagrams for 5000 series RF plug-ins.

1.2 DESCRIPTION

Model 5000 series RF plug-ins are used in the Model 5000 Sweeper, in the Model 5000A Sweep Oscillator, in the Model 50520 Multiband Sweep System, and (with a Model 579 Plug-in Adapter) the Model 540 Multiband Sweeper series (540, 540A, and 540B).

With the exception of beat-frequency oscillator plug-in such as the 5005B and dual-band plug-in such as the 5014-10, all standard RF plug-ins are single-band, fundamental frequency types. Twenty-four standard plug-ins are currently available, covering the frequency range of 100 kHz to 18 GHz. Eight plug-ins will cover the range of 100 kHz to 18 GHz with minimal overlap.

In addition to the standard units, over eighty special units have been produced to satisfy customer requirements for plug-ins with special features; these include ultra-wideband units, narrow band units, high power units, Mil-Spec units, etc. Details of special units are available upon request.

1.3 OPTIONS

Optional configurations of the 5000 series plug-in available on order include:

Option M2. Internal power leveling. Available on 5010 through 5013 plug-ins (500 MHz to 4 GHz). Allows the RF output of the plug-in to be leveled at the RF out connector without the use of external levelers (plug-ins below 500 MHz include internal leveled circuitry).

Option M6. Constant phase-lock sensitivity with 10 kHz bandwidth. Normally, the sensitivity at the phase lock input of the sweeper mainframe (which is connected directly to the plug-in) is a function of the RF output frequency. Option M6 changes this to a constant (customer-specified) factor of the plug-in bandwidth per volt (bandwidth in MHz).

Option M7. Power meter leveling. Units with this option may be leveled with the "recorder" output of H-P 431B/C series power meters and some other power meters. The plug-in includes a selector for normal or power meter leveling.

Option M9. The RF LEVEL controls of units with this option are calibrated in dBm (0 dBm = 1 mW into 50 Ω).

Option M16. This option substitutes a Type TNC RF OUT connector for the normally-used Type N; this option is not available for 5014, 5015, and 5016 plug-ins.

Option M17. This option adds the circuitry necessary to light an external "unleveled" lamp. Plug-ins to be used in a 50520 system should be ordered with option M17.

Option M22. This option substitutes a 3 mm Type SMA RF OUT connector for the normally-used Type N connector; especially useful above 10 GHz.

Option M24. This option substitutes a precision 7 mm Type APC-7 RF OUT connector for the normally-used Type N connector; especially useful above 10 GHz.

1.4 ACCESSORIES

Storage Cabinet Model 9001. The storage cabinet holds four 5000 series RF plug-ins with their dial scales, and bolts on to the side of a 5000 Sweeper or 5000A Sweep Oscillator to form a unit in 5¼ inches of rack space. The storage cabinet keeps the plug-ins available, and prevents loss of dial scales or damage to plug-ins.

Plug-in Extender Model 9202. This unit fits between the sweep oscillator mainframe (5000, 5000A, 520, or 579/540) and the 5000 series RF plug-in to allow easier access for trouble isolation and repair.

Plug-in Inverter Model 9203. Used in conjunction with the 9202 extender, this unit allows physical inversion of the 5000 series plug-in for easier testing or trouble isolation.

Leveling Cable Model 9105. A 24-inch cable with a male Type BNC connector on one end and a Sealectro connector on the other, this accessory is used with the S-D external samplers listed in Table 1.1.

Coaxial Adapter Model 9137. This unit is a Type N male to 7 mm precision (APC-7) sexless connector adapter.

1.5 SPECIFICATIONS

The specifications for all standard 5000 series RF plug-ins are listed in Table 1.1; specifications for special plug-ins will be supplied upon request.

Table 1.1 Specification Chart - Model 5000 S

MODEL	FREQUENCY RANGE, MHz	FREQUENCY RESPONSE, dB
1020	1000 - 12400	±0.75
1020-1	3700 - 11700	±1.0
1021	2000 - 18000	±1.0
1022	8000 - 18000	±0.7
1025	10 - 1000	±0.2
1025-3	50 - 100	±0.2
1026	1000 - 4000	±0.7
1031	1000 - 2000	±0.25
1032	1400 - 2400	±0.25
1033	2000 - 4000	±0.3
1033-2	1700 - 4200	±0.5
1034	3700 - 8300	±0.4
1035	7000 - 12400	±0.7
1036	12400 - 18000	±1.0
1044-1	3700 - 6450	±0.3

FREQUENCY LINEARITY: ≤±1.0%; POWER CONTRO
from 950 to 1050 Hz. Stability ± 1 Hz/°C. Rise and Fall
EXTERNAL LEVELING: Sensitivity ≈10 mV/mW of outp
EXTERNAL AM: Amplitude 0 to 10 V unleveled. Contro
up to 10 MHz; OUTPUT CONNECTOR: Model 5005B, B
Type SMA. Option M24, Type APC-7; AMPLITUDE MA

Directional Detectors for Leveling

Plug-In Model Number	Frequency Range		Power Output[6] (Minimum) at full Output, 50Ω Load		Power Variation vs. Frequency at Full Output, 50Ω Load		Frequency Accuracy at 25° C Full Output	Spurious Signals, Below Full Output Harmonic/ Non-Harmonic	Re
	Rated	Usable	Leveled	Un-leveled	Leveled, Internal Dir. Det.	Leveled, Ext.,Excl. Det. Error			
			mW	*mW*	*dB*	*dB*	*MHz*	*dB*[3]	
5005B[7]	100 kHz - 32 MHz	50 kHz - 32 MHz	20	25	±0.3	±0.05	±0.5	20/50	
5007	10 - 100 MHz	8 - 112 MHz	20[1]	30	±0.1	±0.05	±1	30/60	
5007-1[2]	50 - 100 MHz	47 - 103 MHz	20[2]	30	±0.1[3]	±0.05	±0.5	40/60	
5008-1	100 - 500 MHz	90 - 510 MHz	20[1]	30	±0.2	±0.05	±4	30/60	
5008-4	30 - 300 MHz	25 - 305 MHz	20[1]	25	±0.02	±0.05	±3	30/60	
5010-M2	500 - 1000 MHz	470 - 1030 MHz	20[1]	25	±0.2	±0.05	±5	20/60	
5010-3-M2	0.75 - 1.25 GHz	0.72 - 1.28 GHz	20[1]	25	±0.2	±0.05	±5	20/60	
5011-M2	1 - 2 GHz	0.94 - 2.06 GHz	20[1]	25	±0.25	±0.05	±10	20/60	
5012-M2	1.4 - 2.4 GHz	1.34 - 2.46 GHz	20[1]	25	±0.25	±0.05	±10	20/60	
5013-M2	2 - 4 GHz	1.9 - 4.1 GHz	10[1]	11	±0.3	±0.05	±20	20/60	
5013-2	1.7 - 4.2 GHz	1.65 - 4.25 GHz	–	10	–	±0.05	±25	20/60	
5030	1 - 4 GHz	1 - 4 GHz	–	13	–	±0.05	±40	16 to 2 GHz/50 20 to 4 GHz/50	
5014	4 - 8 GHz	3.9 - 8.1 GHz	–	10	±3	±0.05	±40	20/60	
5014-26	3.2 - 6.5 GHz	3.2 - 6.5 GHz	–	5	–	±0.05	±33	18/60	
5014-10 (dual band)	(1) 3.6 - 4.2 GHz (2) 5.9 - 6.5 GHz	(1) 3.57-4.23 GHz (2) 5.85-6.53 GHz	–	6	–	±0.05	±10	20/60	
5015	8 - 12.4 GHz	7.9 - 12.5 GHz	–	10	–	±0.05	±44	30/60	
5015-2	7 - 11 GHz	6.9 - 11.1 GHz	–	7	–	±0.05	±40	30/60	
5016[5]	12.4 - 18 GHz	12.3 - 18.1 GHz[4]	–	10	–	±0.05	±56	30/60	
5016-2[5]	10 - 15 GHz	9.9 - 15.1 GHz	–	3	–	±0.05	±52	30/45	

1 Internal leveling
2 Output 75Ω internally leveled. Flatness 0.01 dB from 55 to 85 MHz, adjustable. Specify Option M14 for W.E. 509A jack or Option M-15 for W.E. 567A jack.
3 At >1 MHz from carrier.
4 Extendable to 19 GHz on special order.
5 Not usable with older 5000 Sweeper mainframe
6 At 25°C.
7 Heterodyne Unit, 50Ω BNC output connector (Options M25, 75Ω).

eries Oscillator Plug-ins

L RANGE: ≥40 dB; 1 kHz MODULATION: Square Wave, Adjustable
Times < 10 μs at maximum RF output. On-off ratio >40 dB (unleveled);
ut power. Negative Polarity. Impedance 5 kΩ, BNC connector;
l Sensitivity 100 mV/mW leveled. Rise and Fall Time ≤2 μs. Frequency
NC. All Other Models, Precision Type N Stainless Female. Option M22,
RKERS: Switchable On/Off. Adjustable zero to at least 0.2 dB

dual M lex ull ut dB	Residual FM Deviation 1 Hz-30 kHz CW Mode Peak kHz	Frequency Stability, % of Output Frequency				Source VSWR (max.) at any Output Level	Vernier Range MHz	ΔF Range (max.) MHz
		vs. Temp. Change (per °C)	vs. Load VSWR 1:1 to 3:1	vs. RF Power Change, Full Range	vs. 10% Line Change			
46	2	±20 kHz	±0.5 kHz	±3 kHz	±1 kHz	–	1	±1
46	1.5	±0.025%	±0.1%	±0.1%	±0.001%	1.5:1	1	±5.2
46	1.5	±0.03%	±0.2%	±0.2%	±0.001%	1.1:1	1	±2.8
46	1.5	±0.03%	±0.2%	±0.2%	±0.001%	1.6:1	10	±21
46	1.5	±0.05%	±0.2%	±0.2%	±0.001%	1.6:1	10	±14
46	2	±0.05%	±1%	±0.2%	±0.001%	1.6:1	10	±28
46	2	±0.05%	±1%	±0.2%	±0.001%	1.6:1	10	±28
46	4	±0.05%	±1%	±0.25%	±0.001%	1.6:1	10	±56
46	5	±0.05%	±1%	±0.25%	±0.001%	1.6:1	10	±56
46	10	±0.05%	±1%	±0.25%	±0.001%	1.6:1	100	±110
46	15	±0.05%	±1%	±0.25%	±0.001%	–	100	±130
46	10	±0.03%	±0.2%	±0.2%	±0.001%	–	100	±150
46	20	±0.03%	±0.25%	±0.25%	±0.001%	1.5:1	100	±210
46	20	±0.02%	±0.1%	±0.1%	±0.001%	1.5:1	100	±165
46	20	±0.02%	±0.1%	±0.1%	±0.001%	1.5:1	10	±35
46	20	±0.03%	±0.1%	±0.1%	±0.001%	1.5:1	100	±230
46	20	±0.03%	±0.1%	±0.1%	±0.001%	1.5:1	100	±210
46	30	±0.03%	±0.1%	±0.1%	±0.001%	1.5:1	100	±290
46	30	±0.03%	±0.2%	±0.2%	±0.001%	2.5:1	100	±260

SECTION 2

INITIAL INSTRUCTIONS

2.1 UNPACKING AND INSPECTION

The instrument is shipped in a specially constructed container to provide maximum protection to the equipment during transit. Use care when unpacking to prevent damage to the equipment, such as cabinet finish, controls, indicators, connectors, etc.

Removing Contents. To remove the instrument from the shipping container, cut and fold back outer carton top flaps, remove top protective cushion, lift instrument clear from shipping container, open dust protection bag and remove equipment.

Inspection. The instrument was carefully tested and inspected prior to shipment. Inspect the instrument for damage incurred during shipment. If the instrument is damaged in any way, see the warranty and repair notices at the front of this manual.

2.2 PREPARATION FOR USE

Depending upon the type of sweeper with which the 5000 series RF plug-in is to be used, each plug-in is supplied with a clear plastic dial scale, (5000 and 5000A), a metal dial drum (540/579), or a flat metal dial scale (50520). If no preference is stated at the time of ordering, the clear plastic dial scale is shipped.

Installation in 5000 Sweeper or 5000A Sweeper. To install a plug-in in one of these units:

a. Remove the clear plastic dial scale from the bracket on the right side of the plug-in by loosening the two captive knurled knobs.

b. Insert the RF plug-in through the rectangular hole in the sweeper front panel.

c. Lock the plug-in in place by turning the small knob at the top CW.

d. Install the clear plastic dial plate in the large rectangular cutout at the top of the sweeper.

e. Simultaneously tighten both knurled screws by turning CW until they are finger tight. Be sure the dial fits in the panel.

Installation in 50520 Multiband Sweep Systems. Each Model 520 in a 50520 System holds up to four plug-ins:

a. Select the appropriate plug-in compartment in one of the 520's (1 through 4 or 5 through 8).

b. If necessary, remove the blank plug-in panel by turning the locking screw CCW.

c. Insert the RF plug-in into the selected plug-in compartment.

d. Lock the plug-in in place by turning the small knob at the top CW.

e. If necessary, install a new metal dial plate in the 521 Multiband Controller following steps *f* through *i*.

f. Remove the top cover of the 521; it is held in place with two screws.

g. Advance the dial drum assembly until the appropriate blank dial plate (1 through 8) is at the top.

h. Remove the blank dial plate from the dial assembly; it is held in place with four screws.

i. Install the new dial plate with the screws removed in step *h*;

Installation in 540 Multiband Sweeper. A single 5000 series RF plug-in may be installed in a Model 540 sweeper if the 540 has been fitted with a Model 579 adapter:

a. Insert the RF plug-in into the rectangular hole in the center of the 579 adapter.

b. Lock the plug-in in place by turning the small knob at the top CW.

c. If necessary, install a new dial drum in the 540 following steps, *d* through *h*.

d. Remove the top cover of the instrument; it is held in place with two screws.

e. Face the instrument holding the dial scale drum with its gear to the left, and smooth rounded end knob to the right.

f. Push the smooth knob into its mating receptacle near the Plug-in compartment shield. The spring will give way allowing you to lower the left side of the drum.

g. Snap the drum into place and align the locating key with the mating groove in the left side of the drum assembly.

h. Rotate the BAND SELECT knob to assure smooth operation of drum assembly.

2.3 REPACKAGING FOR SHIPMENT

If the instrument is to be packaged for re-shipment, use the original shipping container and packaging. If the original packaging has been discarded or is not in condition for re-use, perform the following packaging procedure:

a. Wrap the instrument in a heavy paper wrapping or plastic protective covering.

b. Place a protective cushion in the bottom of shipping carton and place the instrument on the cushion.

c. Surround the remaining sides and top with additional protective cushions. Place front and rear cushions to provide support of the instrument without resting on the controls or connectors.

2.4 SHIPPING METHOD

This instrument should be shipped only by truck freight, rail freight, air freight, or parcel delivery service. If it is shipped by parcel post, damage is likely to occur. Systron-Donner is not responsible for units damaged in shipment to the factory for repair, whether such units are in warranty or not.

2.5 INSURANCE

Insure the unit for full value whenever it is shipped.

2.6 RETURNS FOR REPAIR

Be sure to fully identify any instrument that is returned to Systron-Donner for repair of any kind, in-warranty or not. The paperwork with the unit must show the instrument serial number, malfunction or problem to be corrected, and the exact address to which the instrument should be returned when repairs are completed.

SECTION 3

OPERATION

3.1 GENERAL

This section contains abbreviated instructions for the operation of a 5000 series RF Plug-in, but does not contain specific operating information for operation of a plug-in in a particular sweep system. Refer to the sweeper mainframe or sweep system manual for specific operating instructions.

3.2 CONTROLS AND CONNECTORS

The various controls and connectors of a typical 5000 series RF plug-in are shown in Figure 3.1 and described in Table 3.1.

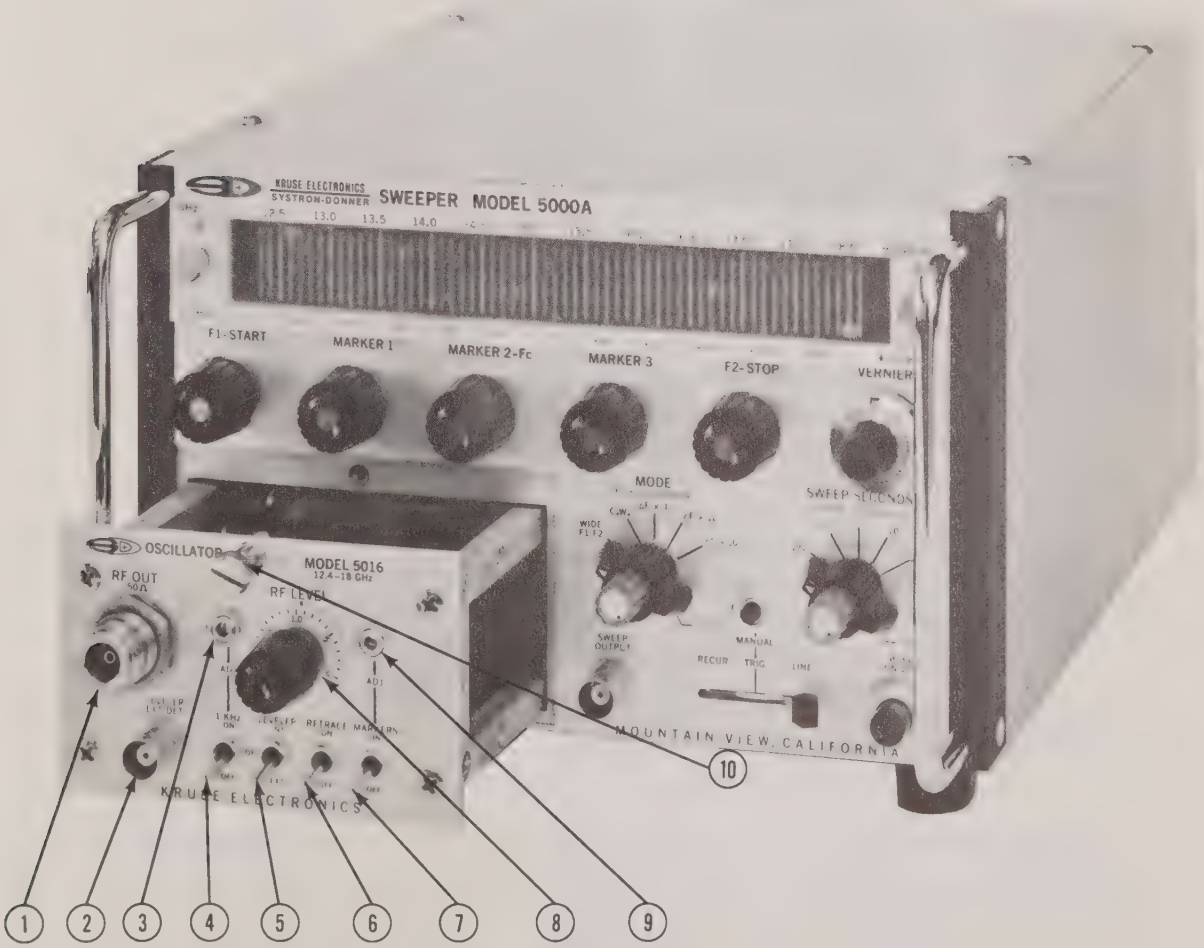


Figure 3.1 5000 Series RF Plug-in Controls and Connectors

Table 3.1 5000 Series RF Plug-in Controls and Connectors

Figure 3.1 Index	*ITEM*	*FUNCTION*
1	RF OUT Connector	Precision Type N connector. RF output point of oscillator. Optional output connectors include TNC, SMA, APC-7, and WE jack. Output impedance is nominally 50 Ω except when ordered with 75 Ω (WE jack or BNC).
2	LEVELER EXT DET Connector . . .	BNC connector. Accepts video output of Models 1020 thru 1044 Directional Detectors for precision power leveling at the load. Sensitivity is approximately 10 mV/mW of output power. Input impedance is 5 kΩ, negative polarity.
3	1 KHZ ADJ Control	Screwdriver-adjust potentiometer. Controls the frequency of the internal 1 kHz square wave modulator from ≈ 950 – 1050 Hz.
4	1 KHZ Switch	Toggle switch. When set to ON, AM modulates RF output with 1 KHz squarewave. Rise and fall times < 10 μs at maximum leveled output, on-off ratio > 40 dB (unleveled).
5	LEVELER Switch INT Position	Three position toggle switch: All 5005 through 5008 series plug-ins and 5010 through 5013 series plug-ins with Option M2 include internal power leveling; when the LEVELER switch is set to INT, the RF output is leveled at the RF OUT connector of these plug-ins without the use of an external detector. Plug-ins without internal leveling do not operate properly when the switch is set to INT: there is no control of power level with the RF LEVEL control; the output is either fully on or fully off.
	OFF Position	The RF output is unleveled, but the RF LEVEL control may be used for control. Maximum peak power output is available in this position.
	EXT Position	All plug-ins may be externally leveled using an appropriate leveler (see Table 1.1). In this position, an external negative voltage at the LEVELER EXT DET connector is used to control the RF output over the frequency range of the plug-in.

Figure 3.1

Index	*ITEM*	*FUNCTION*
6	RETRACE Switch	Toggle switch. When set to ON, RF output is left on during the time the sweep circuits are retracing. When the switch is set to OFF, the internal modulator is automatically set to maximum attenuation during retrace.
7	MARKERS Switch	Toggle switch. When set to ON, turns on three RF dip markers as set by 5000 or 5000A Sweep Oscillator mainframe controls. This switch is non-functional when the 5000 RF plug-in is used in a 50520 system or a 540/579 when the 540 does not have the marker option (markers are standard in Model 540B).
8	RF LEVEL Control	Black knob/potentiometer. Controls the RF output amplitude of the plug-in; when the plug-in is internally or externally leveled, the dial graduations read directly in milliwatts (in dBm with Option M9). This control has a range of ≈ 40 dB.
9	MARKERS ADJ Control	Screwdriver-adjust potentiometer. Controls amount of RF signal attenuation at marker points and thus the size of the markers.
10	Locking Screw	Chrome-plated knob. Used to lock 5000 RF plug-in in place in mainframe.

NOTE: This knob must be tightened to ensure low noise and proper seating of the interface connector.

3.3 OPERATING NOTES

Markers. Markers are generated in the 5000 RF plug-in by momentarily reducing the RF output power in response to marker signals from a 5000 Sweeper, 5000A Sweep Oscillator, or a 540/579 (using a 540 with marker option M3). RF dip markers of this type are not generally used with units having sweep-stop markers such as 50520, 540 Option M4, 540B, and 50525.

The size of the markers is controlled by the front-panel MARKER ADJ potentiometer; the minimum size is equivalent to a power reduction of about 0.2 dB. Under certain circumstances, RF dip markers may not be usable: where there is a great deal of attenuation in the system under test, or when the plug-in is generating maximum unleveled power, the markers may not be visible on the detected waveform. In these cases, the other methods of marker generation (video bypass, intensity, sweep stop) described in the sweeper manual should be used.

Retrace. When the front-panel RETRACE switch is set to OFF, the internal modulator of the RF plug-in is automatically driven to maximum attenuation during the time the sweep ramp from

the sweeper is retracing. This eliminates a possibly confusing extra trace from the oscilloscope or display unit screen. However, under certain circumstances the RETRACE switch should be set to ON: where it is desired that the RF output of the plug-in remain on at all times, such as when average power is being measured or when certain chart recorders are being used, and when phase lock systems are in use, the fast-rising pulses at both ends of sweep might cause measurement errors.

Internal Modulator. The internal 1 kHz modulator drives the modulator with a square wave, reducing the RF output of the plug-in on positive 1 kHz peaks. Most VSWR amplifiers and ratiometers will respond to the demodulated 1 kHz signal. If one of these units is being used, the 1 KHZ ADJ control should be tuned for maximum response of the meter in use before measurements are made. Tuning the plug-in modulating frequency to that of the VSWR amplifier will considerably increase the measurement accuracy and signal-to-noise ratio.

Leveling. Leveling is the process which overcomes the natural tendency of RF sources to generate different power levels at different frequencies due to resonances, losses, and other frequency-sensitive factors. The desired end result for the 5000 series RF plug-in is for the power level generated at all frequencies to be identical. For plug-in units operating below about 4 GHz, internal leveling may be used; 100 kHz to 500 MHz plug-ins feature built-in power levelers, and built-in power levelers are optional on 500 MHz to 4 GHz units. When a plug-in is leveled internally, the power level at the RF OUT connector is essentially flat over the specified frequency range.

To be most useful, leveling should be accomplished as closely as possible to the point of measurement; external leveling is most desirable above 500 MHz or so due to the effects of standing waves in the coaxial cables and frequency sensitivities in other coaxial components in a given test setup. When external leveling is used, the power level at the output of the leveler is essentially identical for all output frequencies.

Phase Lock Input. The phase lock input for the 5000 series RF plug-in is physically located on the rear panel of the sweeper mainframe, but electrically connects directly to the oscillator in the plug-in. Generally, the phase lock input is used to directly control the oscillator frequency to maintain a fixed output frequency or to generate FM. In the first case, the output of a discriminator is commonly used; in the second case, the AC-coupled output of a low-frequency oscillator is used. Table 3.2 lists the specifications for the phase lock inputs of some typical plug-ins.

Two Band Operation. Model 5014-10 RF plug-ins are two band (3.6 to 4.2 GHz or 5.9 to 6.5 GHz) units; the band switch is located between items 2 and 4 of Figure 3.1. The dial scale (or 540 dial drum) supplied with the 5014-10 displays both bands.

Table 3.2 Phase Lock Input Specifications

Plug-in Model	*Approximate Impedance (1) (2)*	*Approx. Sensitivity*	*Approx. Response*	*Maximum Deviation*	*Maximum Ratings(3)*
5007	10 kΩ, 200 pF	0.5 to 5 MHz/V	30 kHz	± 50 MHz	40 V/2 mA
5008	100 Ω to 10 M Ω, 200 pF	5 to 15 MHz/V	1 MHz	± 100 MHz	40 V/2 mA
5008-1	100 Ω to 10 M Ω, 200 pF	2 to 40 MHz/V	5 MHz	± 200 MHz	40 V/2 mA
5010	20 Ω to 10 M Ω, 150 pF	1 to 20 MHz/V	15 MHz	± 250 MHz	60V/10 mA
5011	20 Ω to 10 M Ω, 150 pF	2 to 60 MHz/V	15 MHz	± 500 MHz	60V/10 mA
5012	20 Ω to 10 M Ω, 150 pF	5 to 70 MHz/V	15 MHz	± 500 MHz	60V/10 mA
5013	20 Ω to 10 M Ω, 150 pF	5 to 170 MHz/V	30 MHz	± 1000 MHz	60V/10 mA
5013-3	1 K to 10 M Ω, 150 pF	6 to 22 MHz/V	30 MHz	± 250 MHz	60V/10 mA
5014-1	1 K to 10 M Ω, 150 pF	11 to 28 MHz/V	30 MHz	± 250 MHz	60V/10 mA
5014	0.5 Ω, 50 pF	200 kHz/mA	200 kHz	± 200 MHz	1V/1A
5015	0.5 Ω, 50 pF	100 kHz/mA	200 kHz	± 1000MHz	1 V/1A
5016	0.5 Ω, 50 pF	100 kHz/mA	200 kHz	± 100 MHz	1V/1A

(1) Driver source impedance required is less than 50 Ω on all models except 5014, 5015, and 5016.

(2) Series resistance, shunt capacitance.

(3) Maximum voltage/Maximum current.

SECTION 4

MAINTENANCE

4.1 ROUTINE MAINTENANCE

The 5000 series RF plug-ins do not require routine maintenance or calibration; they should of course be kept free of dust and dirt, but no regularly-scheduled maintenance is necessary.

4.2 CORRECTIVE MAINTENANCE

Field repair of 5000 series RF plug-ins is not recommended. The oscillator, heart of the plug-in, is not a field-repairable item. Replacement oscillators can be supplied for replacement in the field, but the following facts should be kept in mind:

- Many oscillators can be repaired at the factory, at far lower cost than that of a new oscillator.
- Even after an oscillator has been replaced, the plug-in unit will still have to be linearized and calibrated by the selection of precision fixed components. This is a job best done at the factory.
- The plug-in unit and oscillators are covered by a one- or two-year warranty; refer to the front of this manual. Attempted repair may void this warranty.

SECTION 5

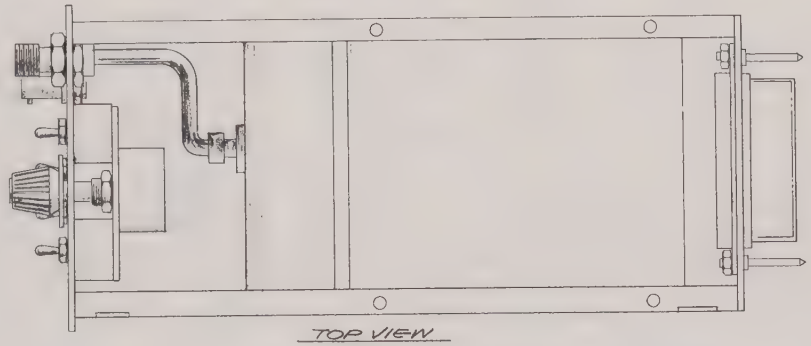
DRAWINGS

This section contains drawings pertaining to the 5000 series RF plug-ins; these drawings are arranged in the following order:

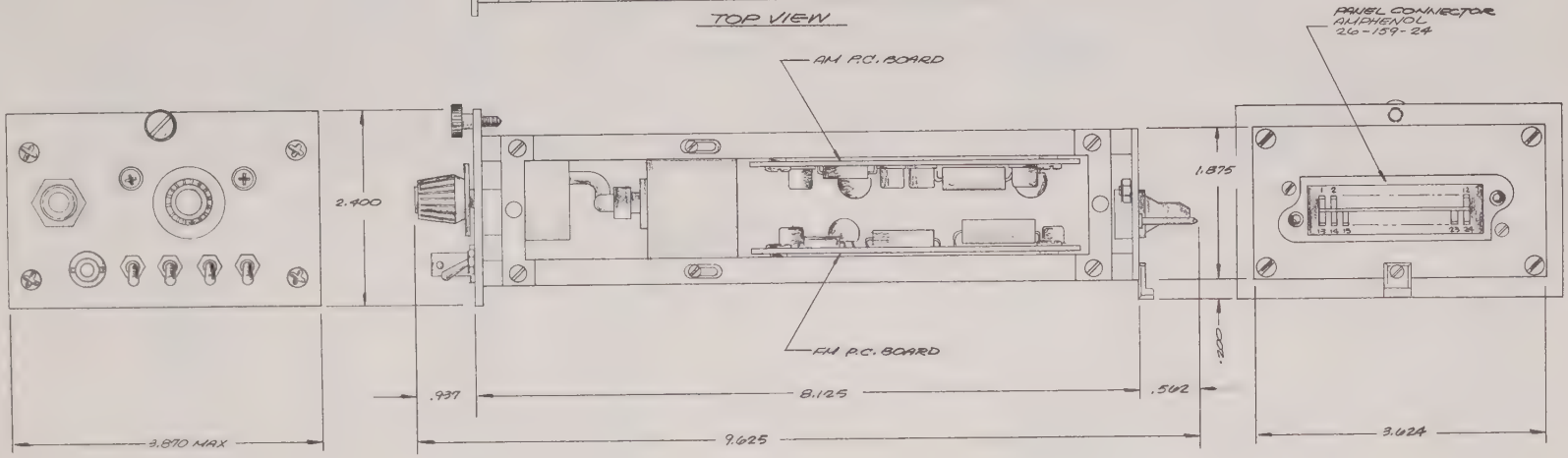
- Outline and Dimensional Drawing (962002)
- Block Diagram, 5000A Sweep Oscillator with 5000 Plug-in (900278)
- Schematic Diagram, 5007-5013, 5014-1 (900265)
- Loading Diagram 5007-5013, 5014-1 (950213), (950279)
- Schematic Diagram 5013 with YIG tuned oscillator (900522), (900512)
- Loading Diagram 5013, 5014, 5030 (YIG DRIVER, 950401)
- Loading Diagram 5013-5016, 5030 (LEVELER, 950384)
- Schematic Diagram, 5014 with YIG tuned oscillator (900387)
- Schematic Diagram, 5015 with YIG tuned oscillators (900389)
- Loading Diagram 5015 (YIG DRIVER 950351)
- Schematic Diagram, 5016 with YIG tuned oscillators (900391)
- Loading Diagram 5016 (YIG DRIVER 950363)
- Schematic Diagram 5030 with YIG tuned oscillators (900505)
- Schematic Diagram 5014-10 with YIG tuned oscillators (900412)

The serial and model number effectivity of each schematic diagram is listed in the lower-right corner of each drawing. Be sure to match the serial number and model number of your plug-in to the drawing to be sure you are using the correct one.

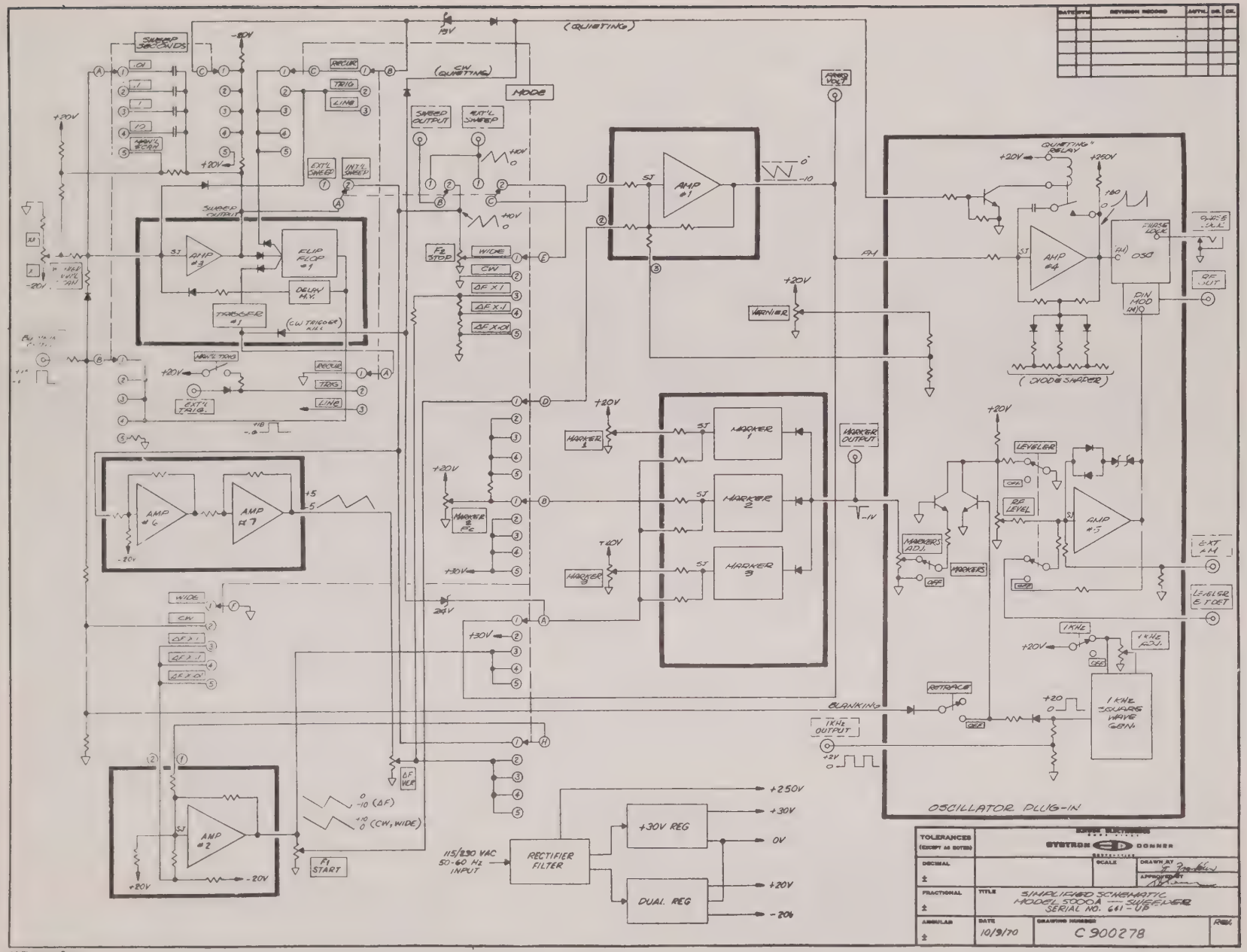
DATE	SYM	REVISION RECORD	AUTH.	DR	CK.



TOP VIEW

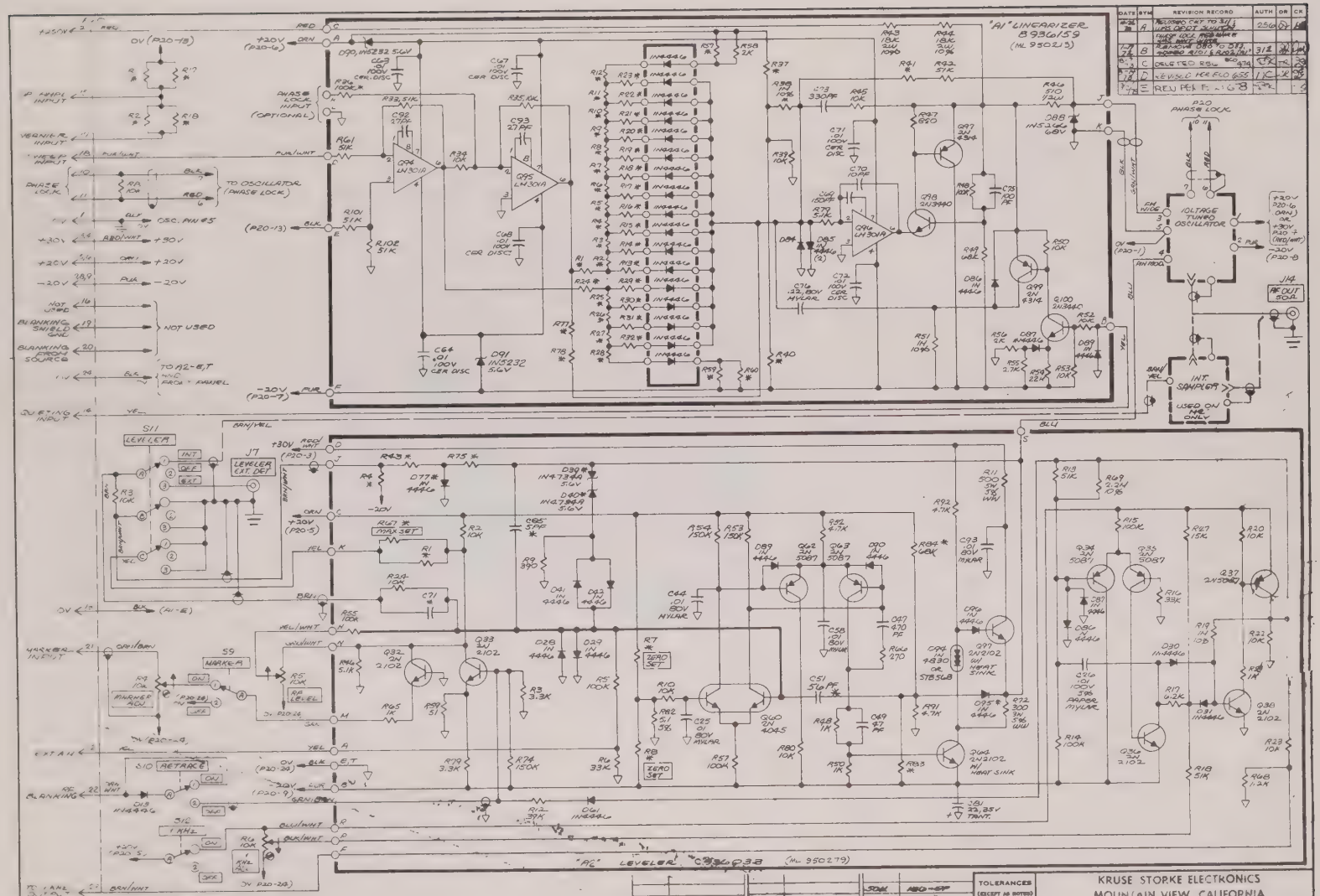


TOLERANCES (EXCEPT AS NOTED)	KRUSE-DRIVE ELECTRONICS MOUNTAIN VIEW, CALIFORNIA		
DECIMAL ±		SCALE	DRAWN BY / APPROVED BY
FRACTIONAL ±	TITLE OUTLINE AND DIMENSIONAL DATA MODEL 5000 PLUG-IN SERIES		
ANGULAR ±	DATE 1-24-67	DRAWING NUMBER B 962002	



DATE	REVISION RECORD	APPR.	DR.	CK.

TOLERANCES (EXCEPT AS NOTED)	SYSTRON DONNER		
DECIMAL ±		SCALE	DRAWN BY JF
FRACTIONAL ±	TITLE SIMPLIFIED SCHEMATIC MODEL 5700A — SWEEPER SERIAL NO. 661-UB		
ANGULAR ±	DATE 10/9/70	DRAWING NUMBER C 900278	REV.


"A1" LINEARIZER 8936159 (ML 950213)
"A2" LEVELER (ML 950279)
REVISION RECORD
SCHEMATIC
MODEL 5000 SERIES OSC. PLUG-IN (VARACTOR TUNED)
KRUSE STORKE ELECTRONICS MOUNTAIN VIEW CALIFORNIA
C 700265
9-29-70

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
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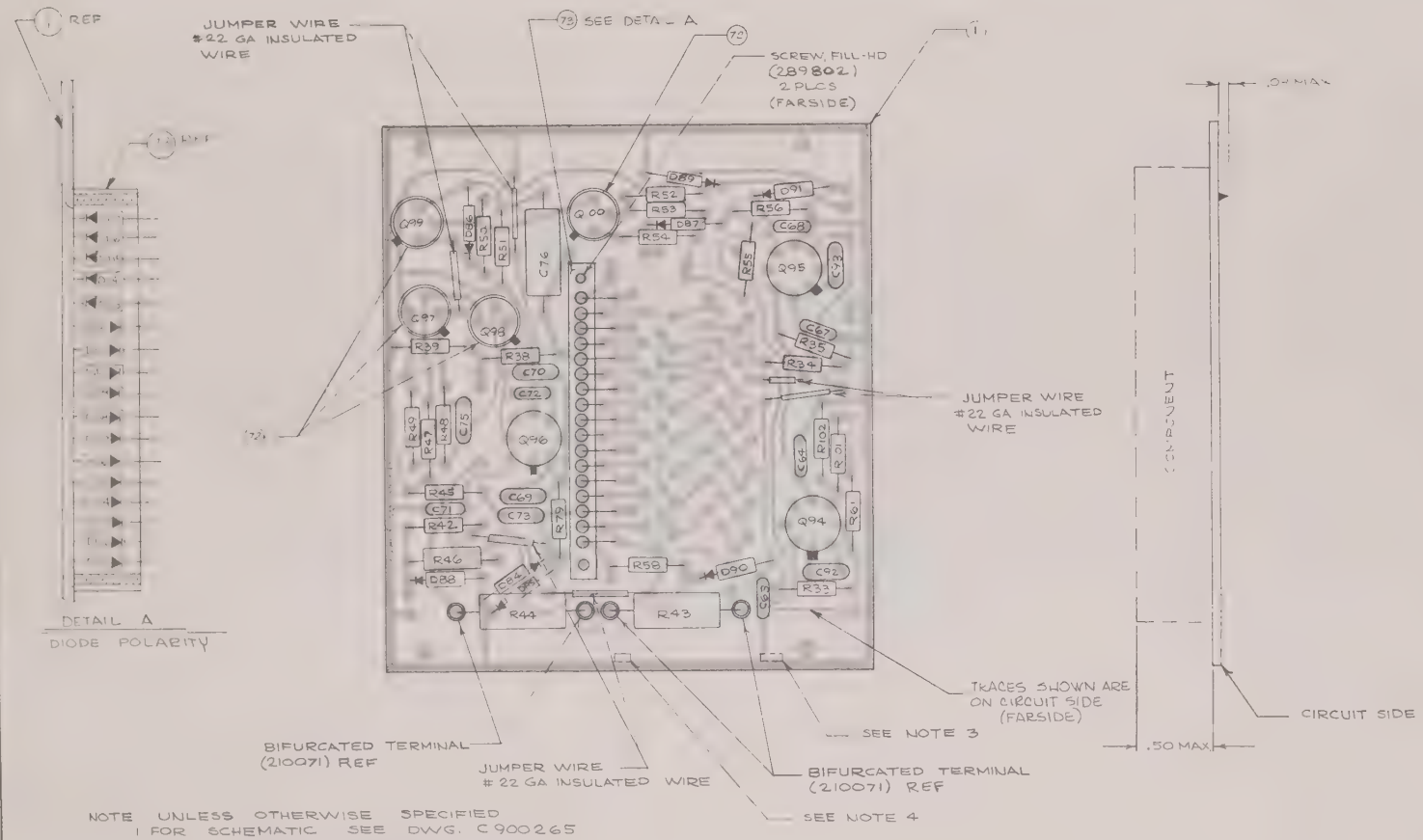
D	REVISED PER ECO 655	8-14-74	



NOTE UNLESS OTHERWISE SPECIFIED

1. FOR SCHEMATIC SEE DWG. C900265
2. FOR MATERIAL LIST SEE ML950213
3. MARK PART NO. REV LETTER APPROXIMATE WHERE SHOWN
4. MARK PREFIX REF DESIG 'A' NO. APPROXIMATE WHERE SHOWN. (A1)

D948451	5005 A		
ML950111	5007 THRU 5014-1	1	
D948451	5005	1	
NEXT ASSY	USED ON	QTY	
APPLICATION			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ANG. ES. ± XX. DEC. ± XXX. DEC. ± SURFACE FINISH

DRAWN JSKAU DATE 8-22-73

CHECK [signature] 8-27-73

ENG [signature]

MFG

KRUSE ELECTRONICS SYBTRON DONNER

LOADING DIAGRAM

LINEARIZER PC BOARD ASSY

CODE IDENT.	SIZE	DWG NO.	REV
29111	C	950213	D

SCALE 2:1 SHEET 1 OF 1

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
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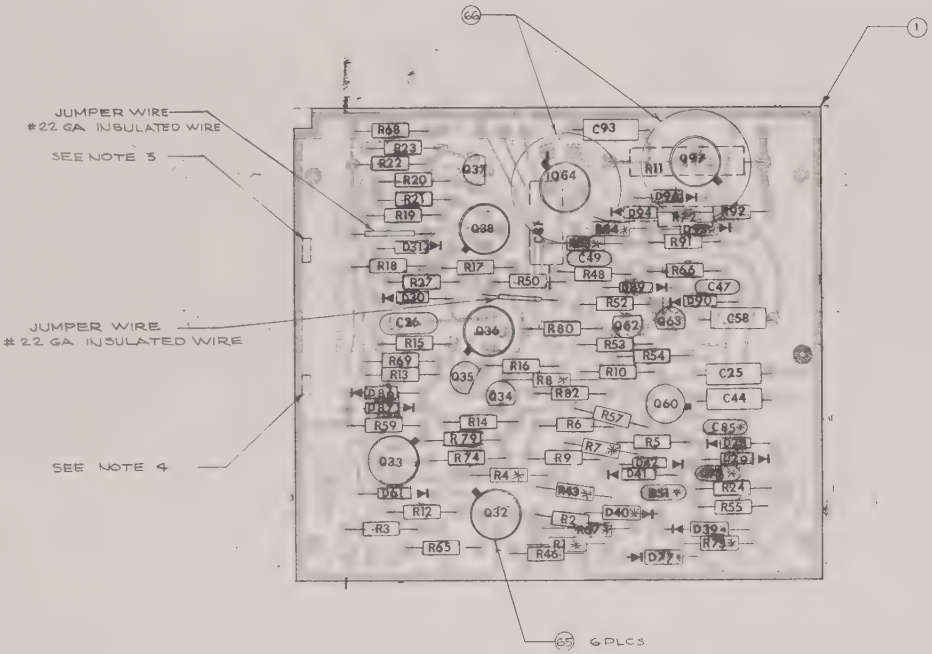
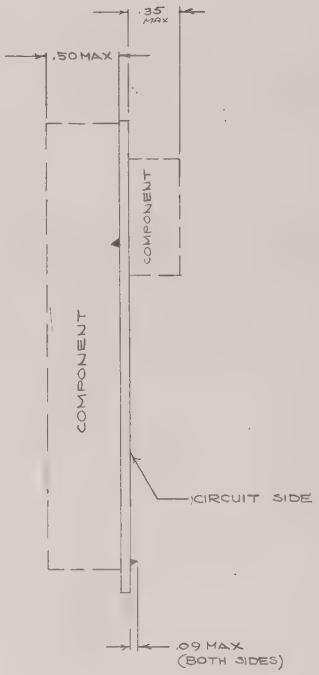
B	REV PER ECO 678	3/12/75	
C	REV & REL PER ECO 10904	12/19/75	





NOTE. UNLESS OTHERWISE SPECIFIED

1. FOR SCHEMATIC SEE DWG. C900265
2. FOR MATERIAL LIST SEE ML 950279
3. MARK PART NO. REV. LETTER APPROXIMATE WHERE SHOWN
4. MARK: PREFIX REF DESIG "A" NO. APPROXIMATE WHERE SHOWN. (A2)

D948451	5005A	1
ML4501.1	5007 THRU 5010	1
D948451	5CX 5	1
NEXT ASSY	USED ON	QTY
APPLICATION		

UN. FSS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES.
ANGLES ±
XX. DEC ±
XXX DEC ±
SURFACE FINISH

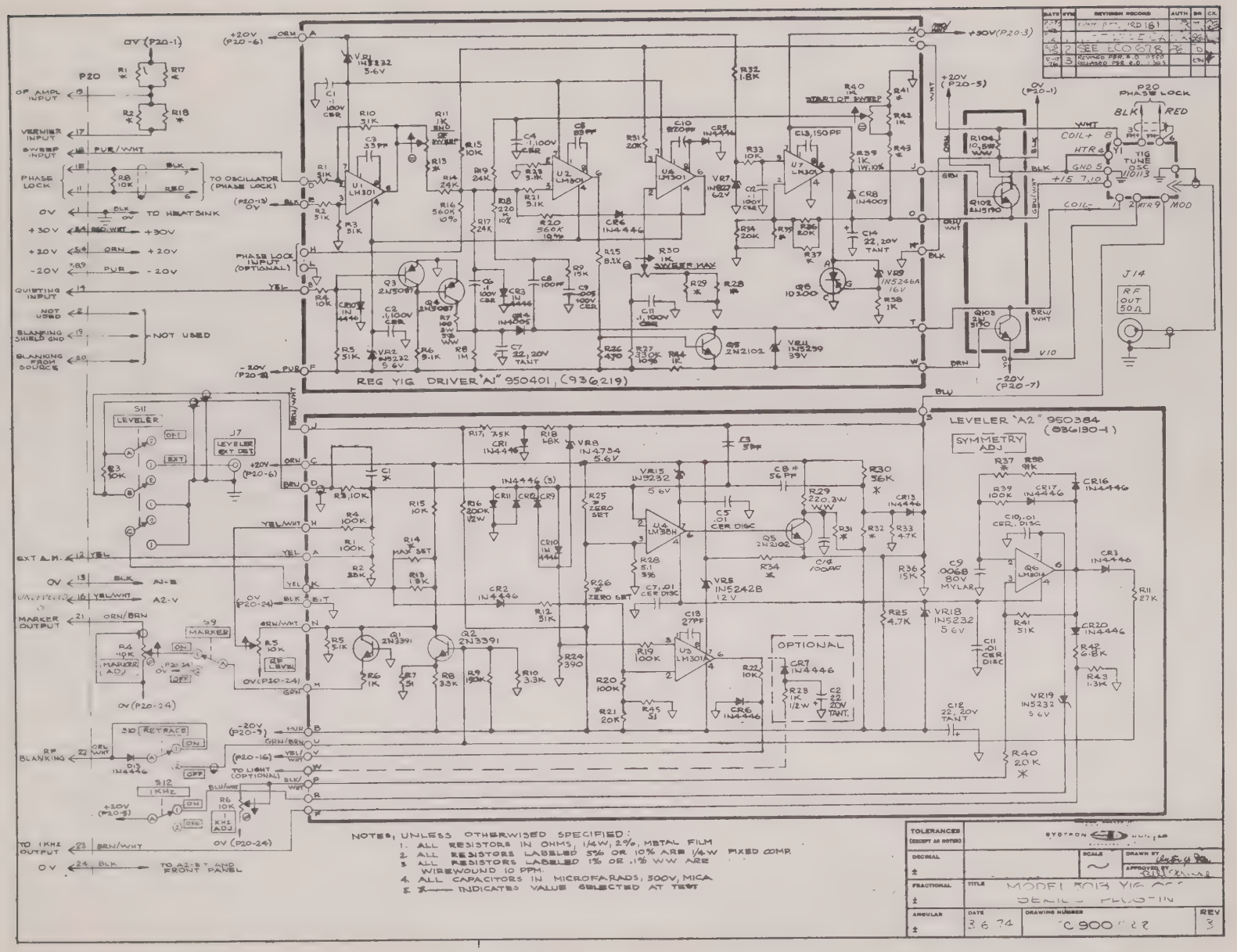
DRAWN JOSON DATE 8-23-73
CHECK 8-29-73
ENG 9/15/75
MFG

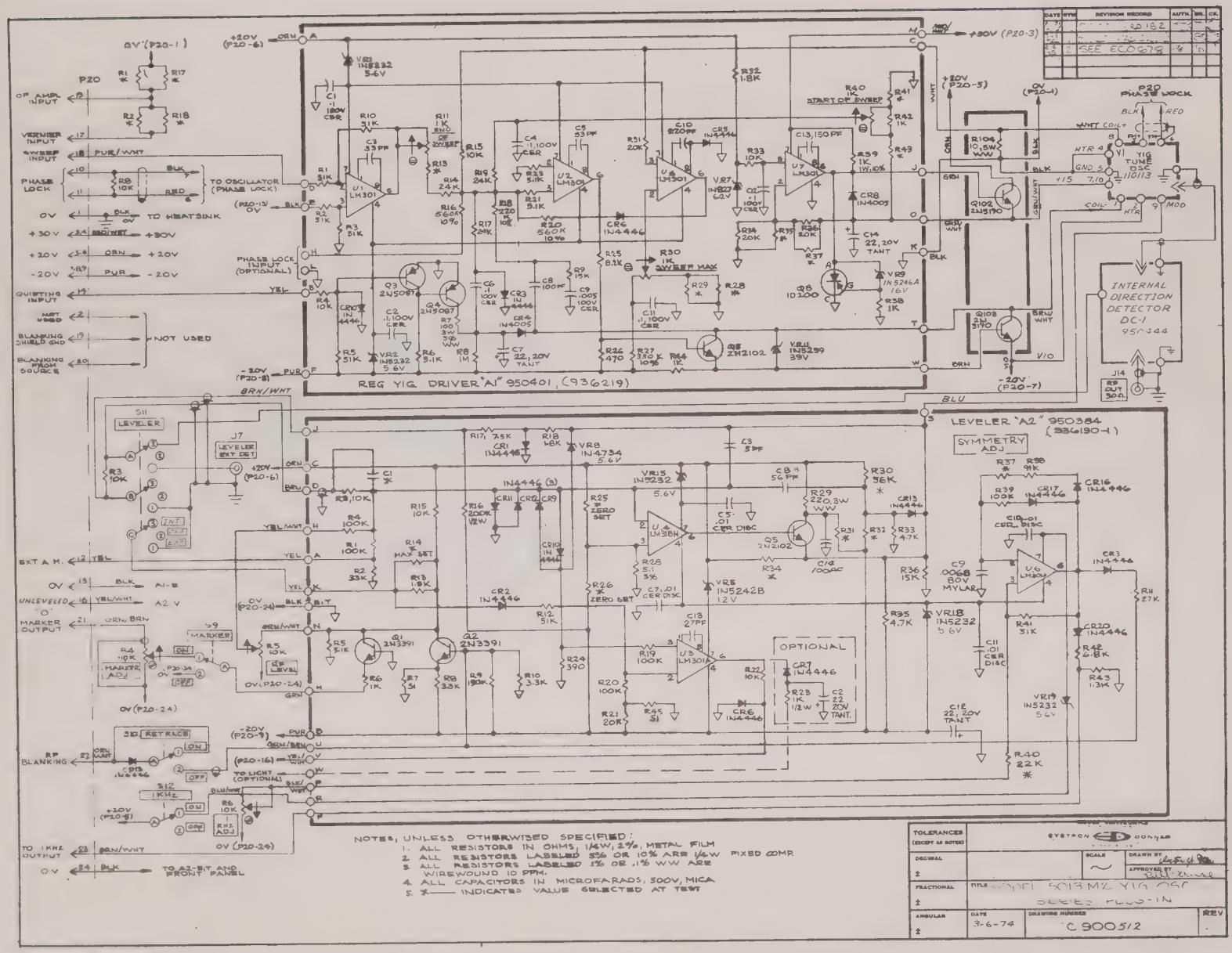
KRUSE ELECTRONICS
SYSTRON DONNER

TITLE
LOADING DIAGRAM
BASIC LEVELER P.C BD ASSY

CODE IDENT.	SIZE	DWG NO.	REV
29111	C	950279	C

SCALE 2/1 SHEET 1 OF 1


REG YIG DRIVER "A1" 950401, (936219)
LEVELER "A2" 950384 (936190-1)
P20 PHASE LOCK
SYMMETRY ADJ
OPTIONAL
NOTES; UNLESS OTHERWISED SPECIFIED:
1. ALL RESISTORS IN OHMS, 1/4W, 2%, METAL FILM
2. ALL RESISTORS LABELED 5% OR 10% ARE 1/4W FIXED COMP.
3. ALL RESISTORS LABELED 1% OR .1% WW ARE WIREWOUND 10 PPM.
4. ALL CAPACITORS IN MICROFARADS, 500V, MICA
5. * INDICATES VALUE SELECTED AT TEST
MODEL 836 YIG OSC
SERIES PLUG-IN
DRAWING NUMBER C900128
DATE 3 6 74


REG YIG DRIVER "A1" 950401, (936219)
LEVELER "A2" 950384 (936190-4)
INTERNAL DIRECTION DETECTOR DC-1 950344
P20 PHASE LOCK
SYMMETRY ADJ
OPTIONAL
NOTES, UNLESS OTHERWISED SPECIFIED:
1. ALL RESISTORS IN OHMS, 1/4W, 2%, METAL FILM
2. ALL RESISTORS LABELED 5% OR 10% ARE 1/4W FIXED COMP.
3. ALL RESISTORS LABELED 1% OR .1% WW ARE WIREWOUND 10 PPM.
4. ALL CAPACITORS IN MICROFARADS, 500V, MICA
5. * INDICATES VALUE SELECTED AT TEST
SYSTRON DONNER
SERIES PLUG-IN
C 900512
3-6-74

REVISIONS			
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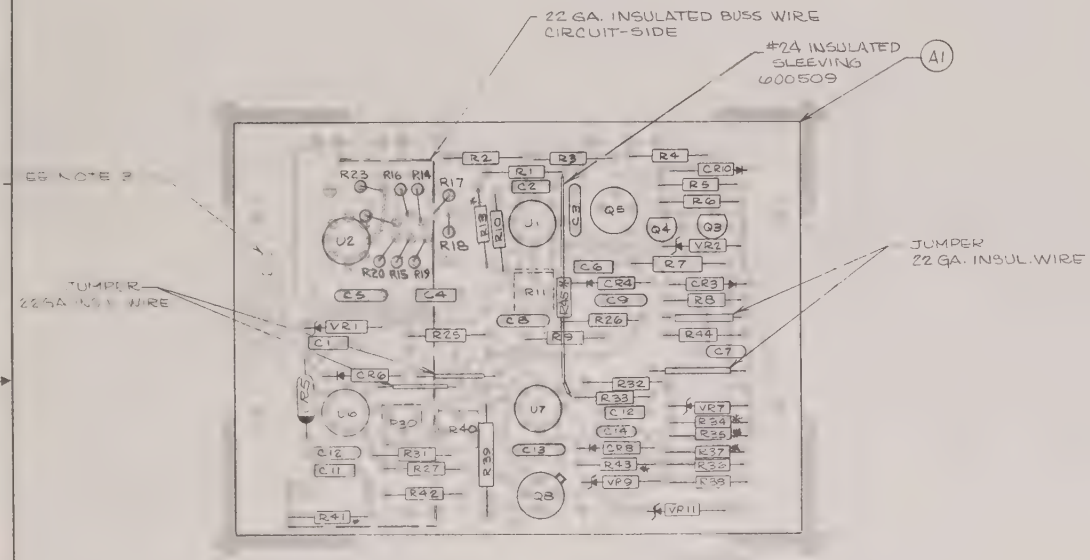
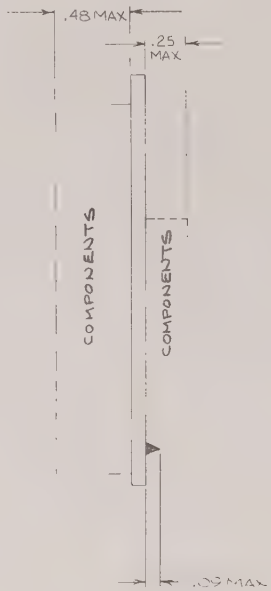
C	REV PER ECO 706	12-12-74	





NOTE: UNLESS OTHERWISE SPECIFIED

1. FOR SCHEMATIC SEE C900387
2. FOR MATERIAL LIST SEE ML 950401
3. MARK APPLICABLE REV. LETTER.
4. R11, R30, R40 ARE MOUNTED ON CIRCUIT-SIDE
5. * VALUES SELECTED BY TEST

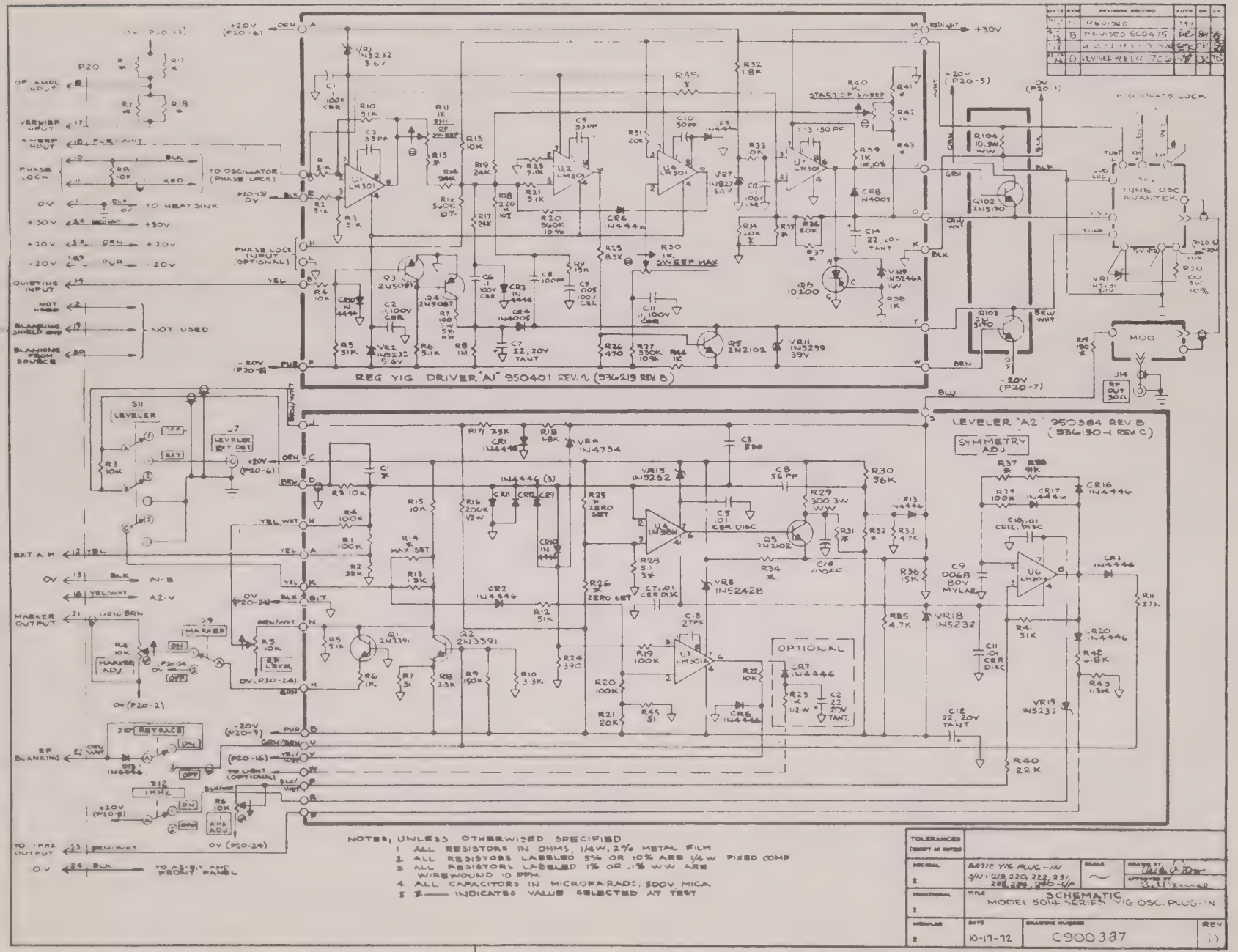
AVANTEK OSCILLATOR

			UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: ANGLES ± XX DEC ± XXX DEC ± SURFACE FINISH	ERUBE ELECTRONICS SYSTRON DONNER
			DRAWN	DATE 1-8-74
5-3-74	5014	1	CHECK	1-8-74
NEXT ASSY	USED ON	QTY	ENG	3/6/74
APPLICATION			MFG	

TITLE: LOADING DIAGRAM YIG DRIVER PC BD ASSY

CODE IDENT.	SIZE	DWG NO.	REV
29111	C	950401	C

SCALE 2/1 SHEET 1 OF 1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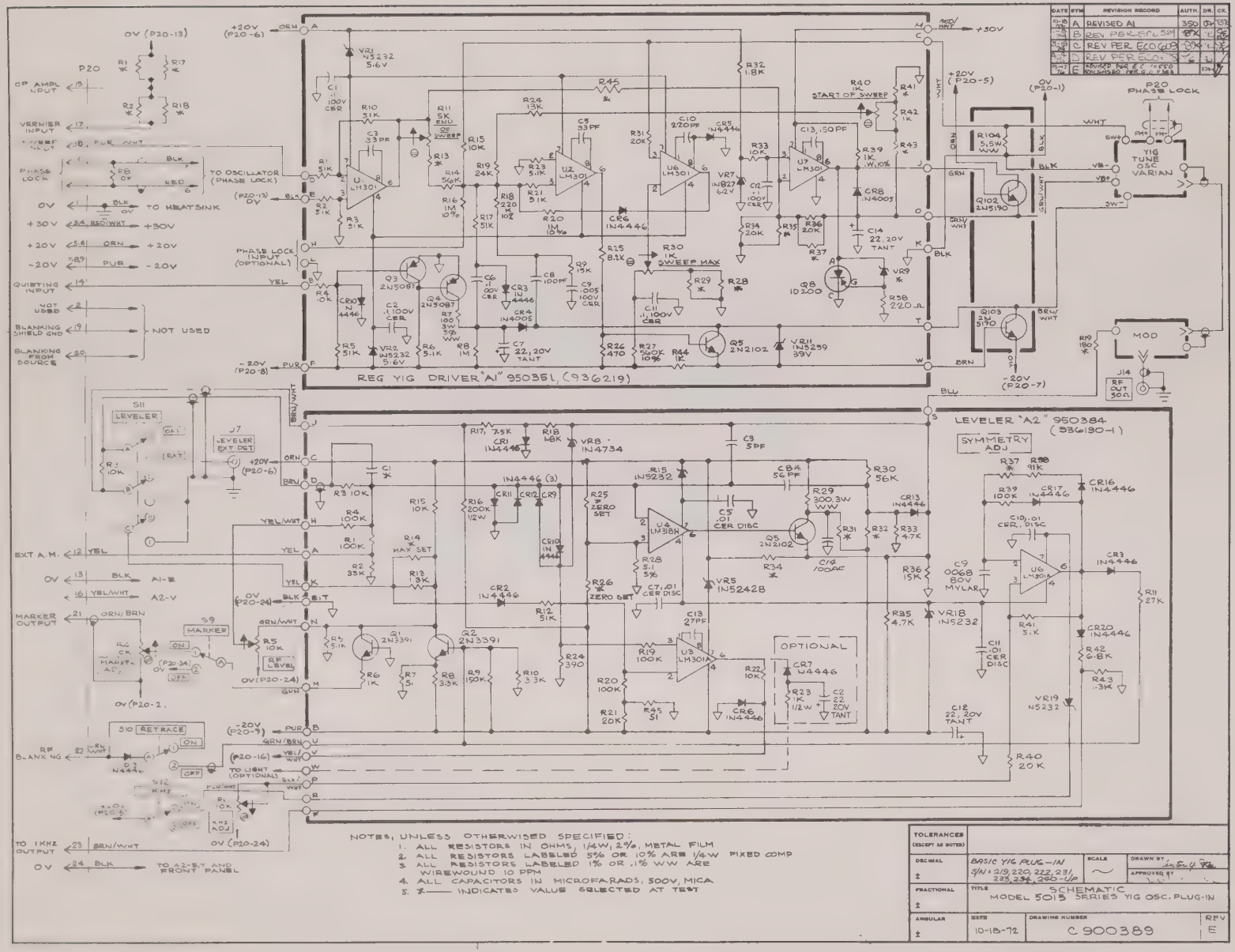
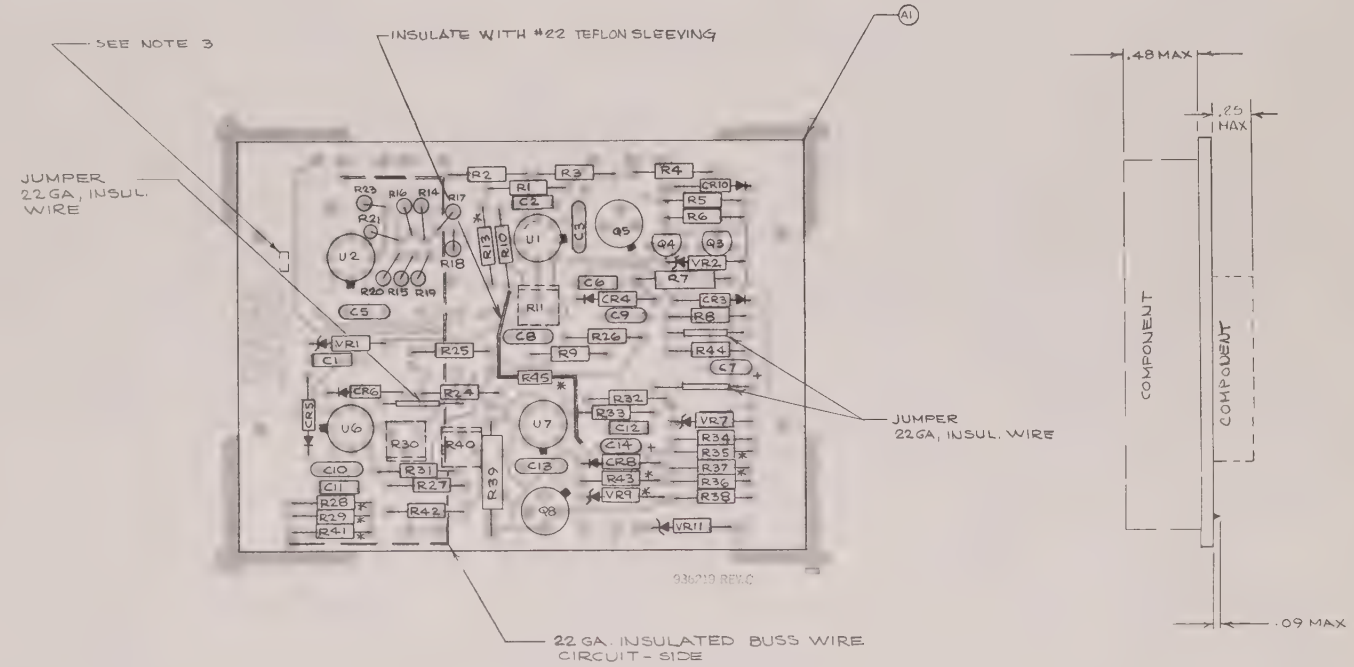
LEVELER "A2" 950384 REV B (936190-1 REV C)
P.C. PHASE LOCK
TUNE OSC AVANTEK
MOD
SYMMETRY ADJ
OPTIONAL
NOTES; UNLESS OTHERWISED SPECIFIED
1 ALL RESISTORS IN OHMS, 1/4W, 2% METAL FILM
2. ALL RESISTORS LABELED 5% OR 10% ARE 1/4 W FIXED COMP
3 ALL RESISTORS LABELED 1% OR .1% WW ARE WIREWOUND 10 PPM.
4 ALL CAPACITORS IN MICROFARADS, 500V MICA
5 X —— INDICATES VALUE SELECTED AT TEST
BASIC YIG PLUG-IN
SCHEMATIC
MODEL 5014 SERIES YIG OSC. PLUG-IN
10-17-72
C900387


REG YIG DRIVER "A1" 950351, (936219)
LEVELER "A2" 950384 (936190-1)
P20 PHASE LOCK
YIG TUNE OSC VARIAN
MOD
SYMMETRY ADJ
OPTIONAL
NOTES, UNLESS OTHERWISED SPECIFIED:
1. ALL RESISTORS IN OHMS, 1/4W, 2%, METAL FILM
2. ALL RESISTORS LABELLED 5% OR 10% ARE 1/4W FIXED COMP
3. ALL RESISTORS LABELLED 1% OR .1% WW ARE WIREWOUND 10 PPM
4. ALL CAPACITORS IN MICROFARADS, 500V, MICA
5. * INDICATES VALUE SELECTED AT TEST
TOLERANCES (EXCEPT AS NOTED)
DECIMAL ±
FRACTIONAL ±
ANGULAR ±
BASIC YIG PLUG-IN
S/N'S 219,220,222,231, 235,239,260-UP
SCALE
DRAWN BY
APPROVED BY
TITLE
SCHEMATIC
MODEL 5015 SERIES YIG OSC. PLUG-IN
DATE 10-18-72
DRAWING NUMBER C 900389
REV E

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
D	CREATED PER ECO 443	6-28-73	
E	REV PER ECO 509	8-30-73	
F	REVISED PER ECO 601	1-31-74	
G	REVISED PER ECO 609	3-8-74	

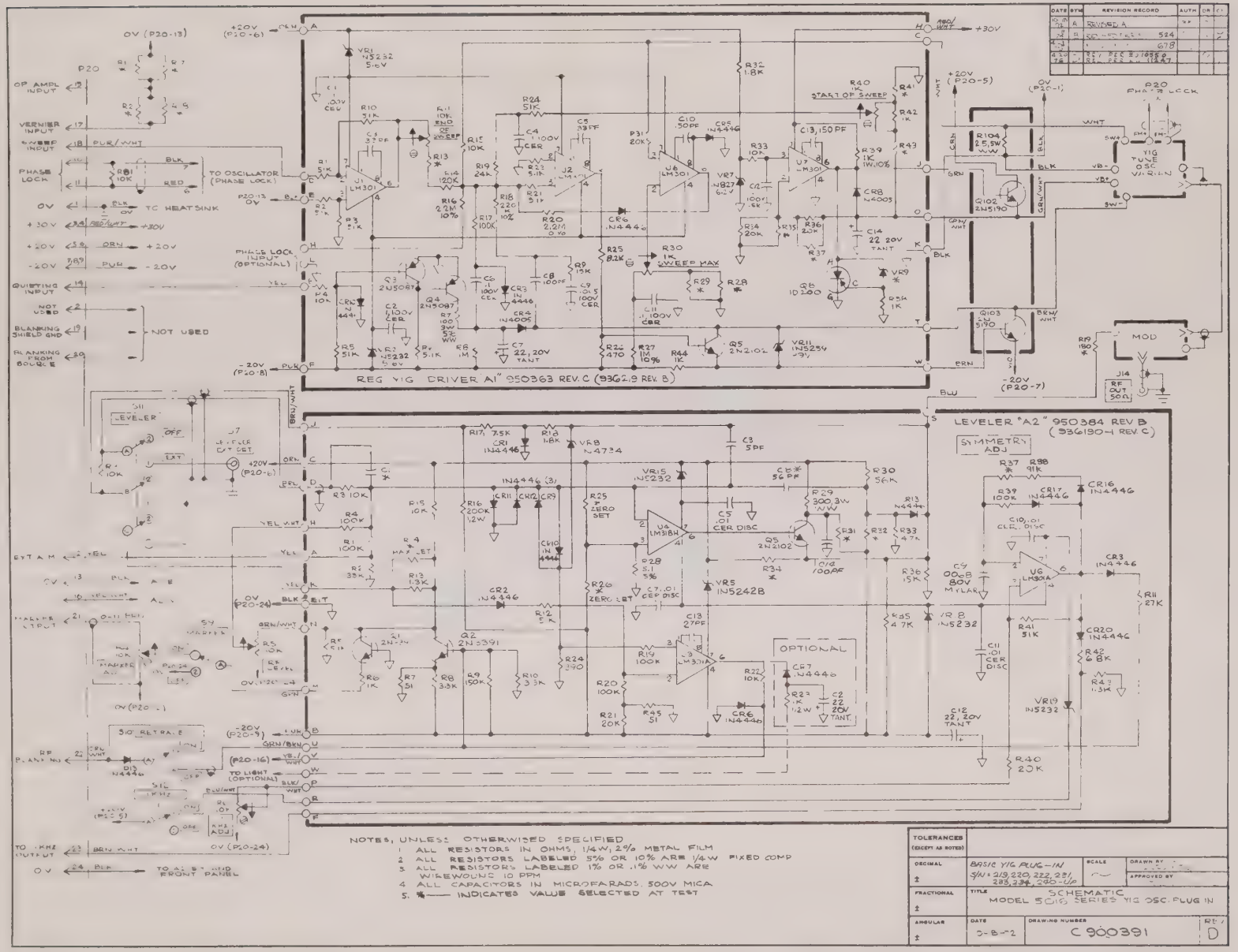


NOTE UNLESS OTHERWISE SPECIFIED.

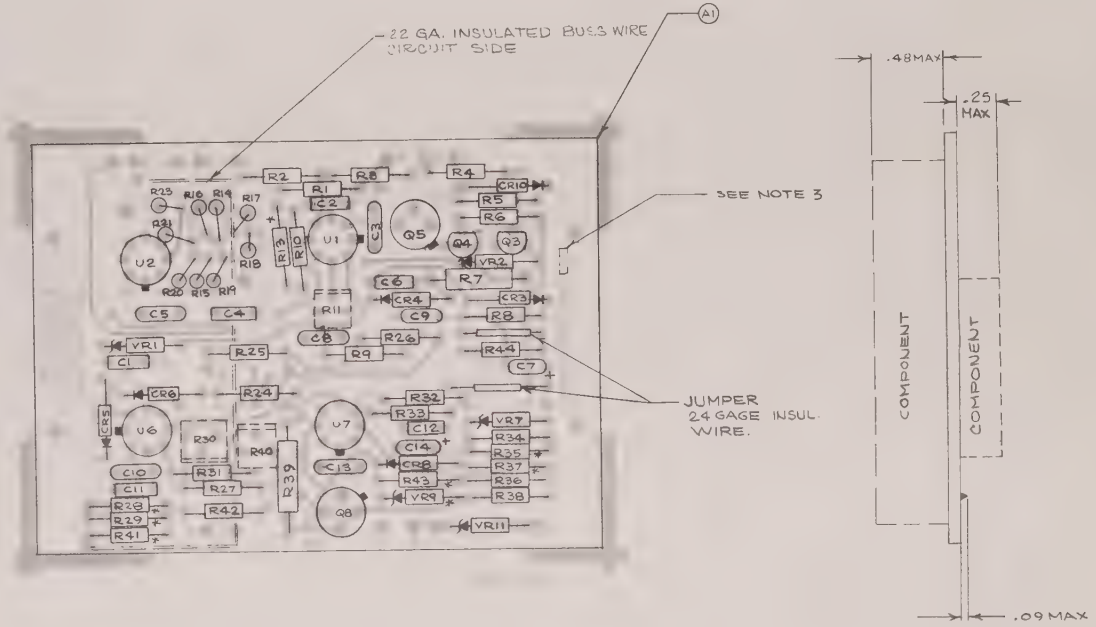
1. FOR SCHEMATIC SEE DWG C900389 ;
2. FOR MATERIAL LIST SEE ML 950351
3. MARK APPLICABLE REV. LETTER
4. R11, R30, R40 ARE MOUNTED ON CIRCUIT-SIDE
5. * VALUES SELECTED BY TEST.

VARIAN OSCILLATOR

			UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: ANGLES ± XX DEC ± XXX DEC ± SURFACE FINISH	KRUSE ELECTRONICS SYSTRON DONNER	
			DRAWN JOSON	DATE 6-27-73	TITLE LOADING DIAGRAM YIG DRIVER P.C. BOARD ASSY
950367	5015	1	CHECK	6-7-73	CODE IDENT 29111 / SIZE C / DWG NO 950351 / REV G
NEXT ASSY	USED ON	QTY	ENG	8/7/73	
APPLICATION			MFG		SCALE 2:1 / SHEET 1 OF 1


REG YIG DRIVER A1" 950363 REV. C (936219 REV. B)
LEVELER "A2" 950384 REV B (936190-1 REV. C)
P20
OP AMPL INPUT
VERNIER INPUT
SWEEP INPUT
PHASE LOCK
0V
+30V
+20V
-20V
QUIETING INPUT
NOT USED
BLANKING SHIELD GND
BLANKING FROM BOUNCE
TO OSCILLATOR (PHASE LOCK)
TO HEATSINK
PHASE LOCK INPUT (OPTIONAL)
-20V (P20-8)
+20V (P20-6)
+30V
+20V (P20-5)
0V (P20-1)
-20V (P20-7)
START OF SWEEP
SWEEP MAX
SYMMETRY ADJ
OPTIONAL
TO LIGHT (OPTIONAL)
TO A1 FRONT PANEL
MOD
RF OUT 50Ω
YIG TUNE OSC VR1 R-N
Q102 2N5190
Q103 5190
S11 LEVELER
S10 RETRACE
S9 MARKER
J7 LEVELER EXT SET
MARKER INPUT
EXT AM
RF LEVEL
RF PLANAR NO
TO 1 KHZ OUTPUT
1 KHZ ADJ
VR1 1N5232 5.6V
VR2 1N5232 5.6V
VR3 1N5232 5.6V
VR4 1N4734
VR5 1N5242B
VR7 1N827 6.2V
VR8 1N5232
VR9 1D200
VR11 1N5234
VR15 1N5232
VR19 1N5232
U1 LM301
U2 LM301
U3 LM318H
U4 LM318H
U5 LM318A
U6 LM308A
U7 LM301
U8 LM301
Q1 2N3391
Q2 2N3391
Q3 2N5087
Q4 2N5087
Q5 2N2102
CR1 1N4446
CR2 1N4446
CR3 1N4446
CR4 1N4005
CR6 1N4446
CR7 1N4446
CR8 1N4005
CR9 1N4446
CR10 1N4446
CR11 1N4446
CR12 1N4446
CR13 1N4446
CR16 1N4446
CR17 1N4446
CR20 1N4446
D13 1N4446
NOTES, UNLESS OTHERWISED SPECIFIED
1 ALL RESISTORS IN OHMS, 1/4W, 2% METAL FILM
2 ALL RESISTORS LABELED 5% OR 10% ARE 1/4W FIXED COMP
3 ALL RESISTORS LABELED 1% OR .1% WW ARE WIREWOUND 10 PPM
4 ALL CAPACITORS IN MICROFARADS, 500V MICA
5. % —— INDICATES VALUE SELECTED AT TEST
TOLERANCES (EXCEPT AS NOTED)
DECIMAL ±
FRACTIONAL ±
ANGULAR ±
BASIC YIG PLUG-IN
S/N's 219,220,222,231, 285,234, 290-up
SCALE
DRAWN BY
APPROVED BY
TITLE SCHEMATIC MODEL 5010 SERIES YIG OSC. PLUG IN
DATE 3-8-72
DRAWING NUMBER C 900391
REV D

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
C	CREATED PER ECO 443	6-28-73	[illegible]
D	REVISED PER ECO 524	1-31-74	[illegible]



NOTE UNLESS OTHERWISE SPECIFIED

1 FOR SCHEMATIC SEE DWG. C900360, C900391

2 FOR MATERIAL LIST SEE ML 950363

3 MARK APPLICABLE REV. LETTER

4 R11, R30, R40 ARE MOUNTED ON CIRCUIT-SIDE

5 * VALUES SELECTED BY TEST.

VARIAN OSCILLATOR

ML 950367	5016	1	
NEXT ASSY	USED ON	QTY	
APPLICATION			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ANGLES ± XX DEC ± XXX DEC ± SURFACE FINISH

DRAWN JOSON DATE 6-22-73

CHECK [illegible] 6-73

ENG [illegible] 6/1/73

MFG

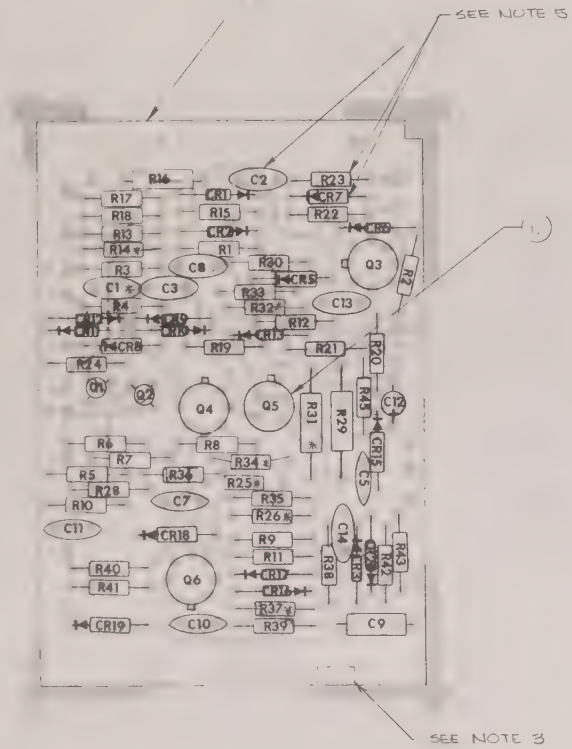
KRUSE ELECTRONICS SYSTRON DONNER

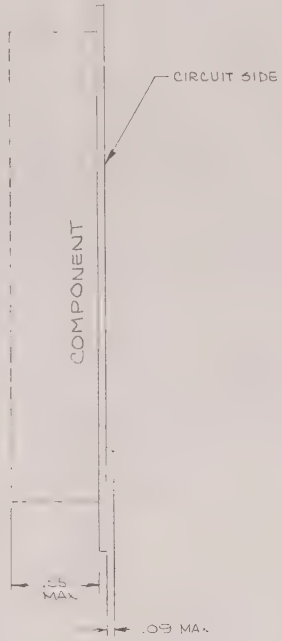
TITLE LOADING DIAGRAM YIG DRIVER P.C. BOARD ASSY

CODE IDENT.	SIZE	DWG NO.	REV
29111	C	950363	D

SCALE 2:1 SHEET 1 OF 1

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
C	REV. PER ECO 6177	9/24/74	[illegible]





NOTE, UNLESS OTHERWISE SPECIFIED:

1. FOR MATERIAL LIST SEE ML 950384
2. FOR SCHEMATIC SEE C900412
3. MARK REVISION APPROXIMATELY WHERE SHOWN
4. * INDICATES COMPONENT SELECTED AND LOADED AT TEST
5. R23, CR7, AND C2 ARE OPTIONAL COMPONENTS FOR USE WITH MODIFICATIONS AND SHALL NOT BE LOADED

ML 950367	5030		
ML 950367	5016		
ML 950367	5015	1	
ML 950307	5014 10	1	
ML 950367	5014		
ML 950367	5014AL		
ML 950367	5013A	1	
NEXT ASSY	USED ON	QTY	
APPLICATION			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES
ANGLES ±
XX DEC ±
XXX DEC ±
SURFACE FINISH

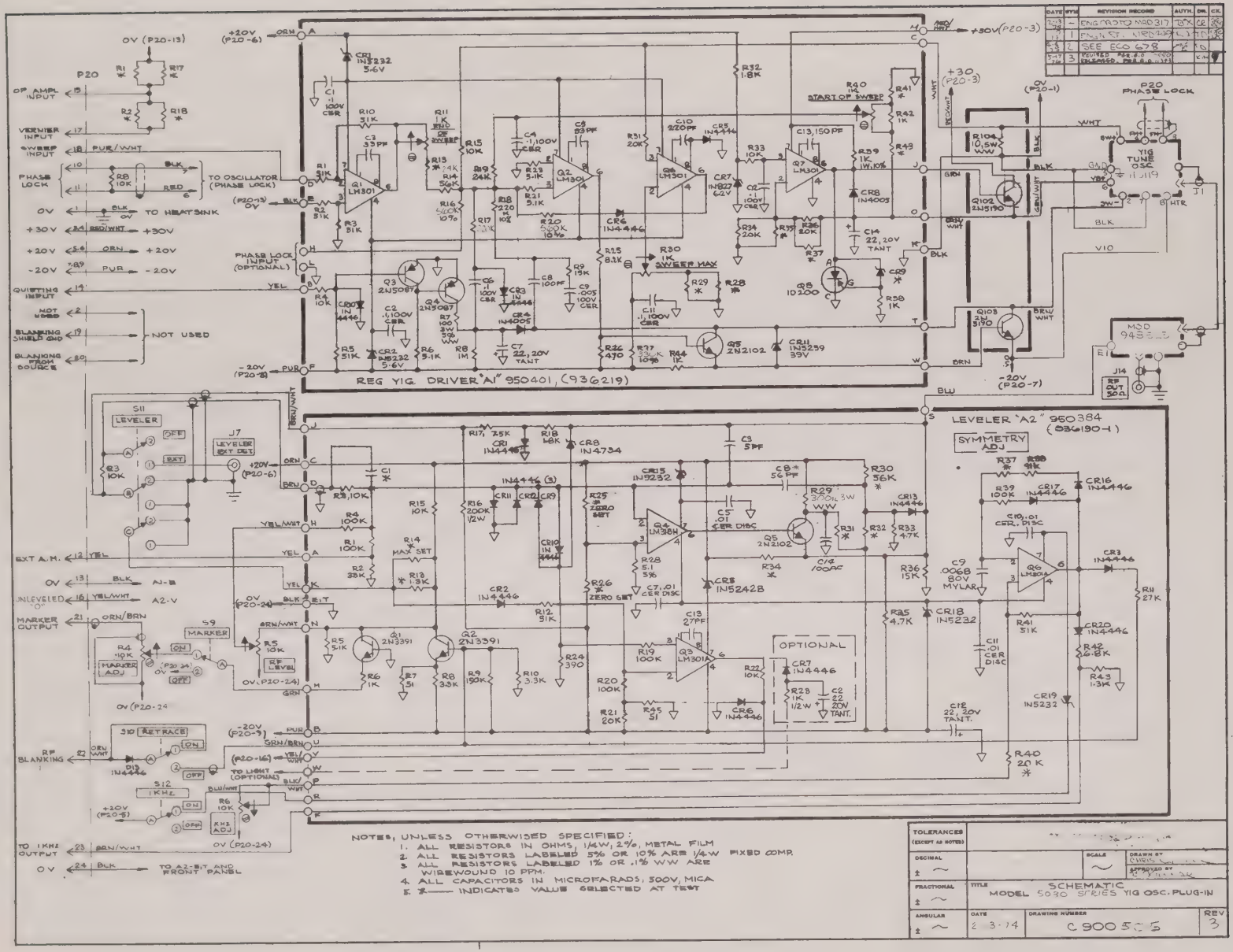
		DATE
DRAWN	[illegible]	
CHECK	[illegible]	9-24-74
ENG		
MFG		

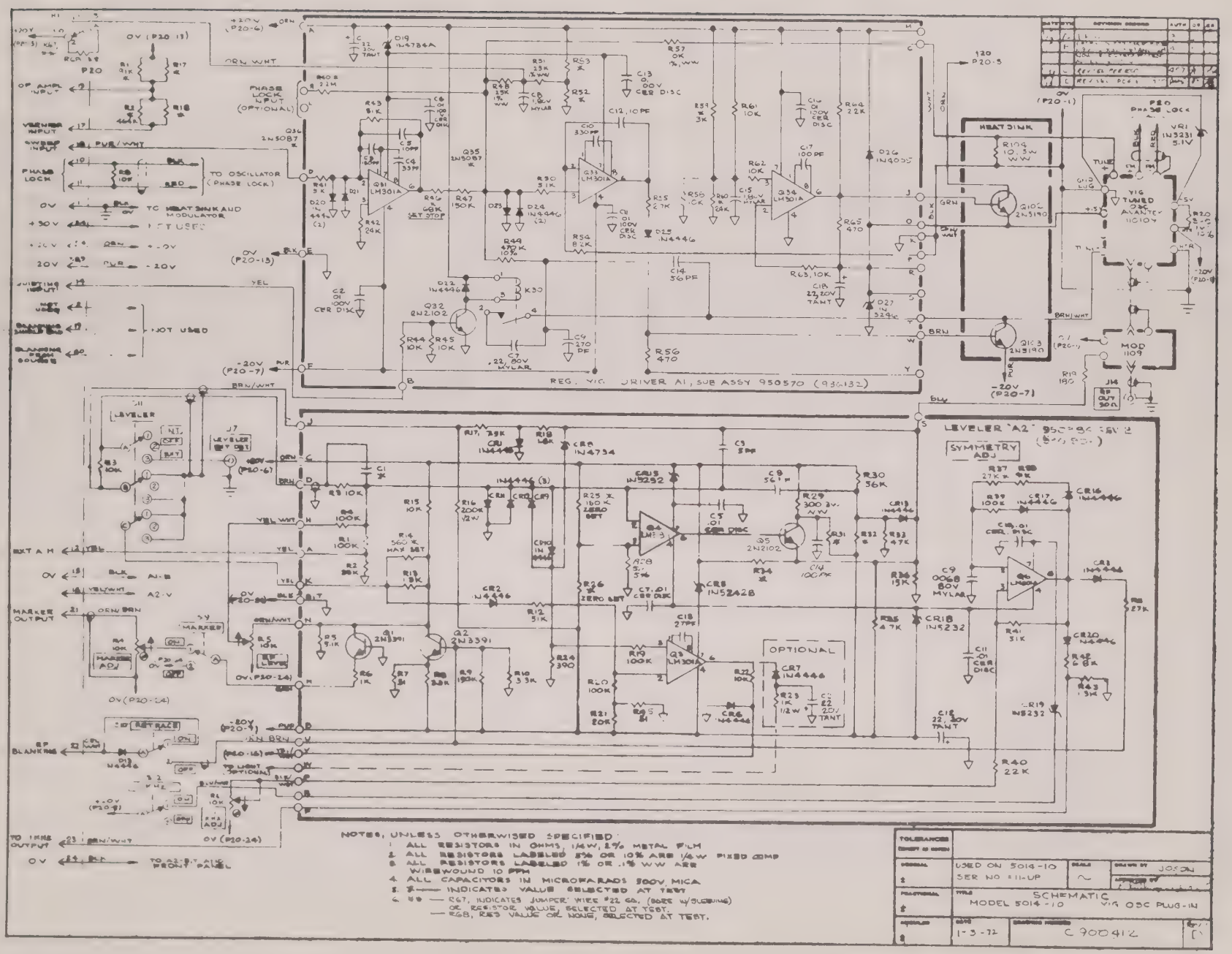
KRUSE ELECTRONICS
SYSTRON DONNER

TITLE: PC, WIRE LEVELER ASSY

CODE IDENT.	SIZE	DWG NO	REV
29111	C	[illegible]	C

SCALE 2/1 SHEET OF


REG YIG DRIVER "A1" 950401, (936219)
LEVELER "A2" 950384 (936190-1)
P20 PHASE LOCK
YIG TUNING OSC 11119
SYMMETRY ADJ
OPTIONAL
NOTES, UNLESS OTHERWISED SPECIFIED:
1. ALL RESISTORS IN OHMS, 1/4W, 2%, METAL FILM
2. ALL RESISTORS LABELED 5% OR 10% ARE 1/4W FIXED COMP.
3. ALL RESISTORS LABELED 1% OR .1% WW ARE WIREWOUND 10 PPM.
4. ALL CAPACITORS IN MICROFARADS, 500V, MICA
5. * INDICATES VALUE SELECTED AT TEST
SCHEMATIC
MODEL 5080 SERIES YIG OSC. PLUG-IN
C900505
REV 3


REG. VIC. DRIVER A1, SUB ASSY 950570 (93A132)
LEVELER "A2" 950570-10 (93A132-10)
SYMMETRY ADJ
HEAT SINK
OPTIONAL
NOTES, UNLESS OTHERWISED SPECIFIED:
1. ALL RESISTORS IN OHMS, 1/4W, 2% METAL FILM
2. ALL RESISTORS LABELED 5% OR 10% ARE 1/4 W FIXED COMP
3. ALL RESISTORS LABELED 1% OR .1% WW ARE WIREWOUND 10 PPM
4. ALL CAPACITORS IN MICROFARADS 500V MICA
5. X —— INDICATES VALUE SELECTED AT TEST
6. 99 — RGT, INDICATES 'JUMPER' WIRE #22 GA. (BARE W/SLEEVING) OR RESISTOR VALUE, SELECTED AT TEST.
— RGB, RES VALUE OR NONE, SELECTED AT TEST.
SCHEMATIC
MODEL 5014-10 VIA 05C PLUG-IN
USED ON 5014-10
SER NO 111-UP
JOSN
1-3-72
C900412

SUNNYVALE
DIVISION
SYSTRON DONNER
CORPORATION

735 Palomar Avenue, Sunnyvale, California 94086 USA
Telephone (408) 735-9660, TWX 910-339-9309

RECOMMENDED SPARES LIST

Basic Linearizer Board

MODEL NO. 5000 RF Plug
KIT NO. 950213 (A1)

DESCRIPTION	S-D PART NO.	QTY./UNIT	QTY./YEAR	BUY QTY.	PRICE*
C63 Cer, .01μF, 100V	150100				
C64 Cer, .01μF, 100V	150100				
C67 Cer, .01μF, 100V	150100				
C68 Cer. .01μF, 100V	150100				
C69 Mica 150 pF, 500V	155500				
C70 Mica 10 pF, 500V	155462				
C71 Cer, .01μF, 100V	150100				
C72 Cer, .01μF, 100V	150100				
C73 Mica, 300pF, 500V	155511				
C75 Mica, 100pF, 500V	155490				
C76 Mylar, .22μF, 80V	157020				
C92 Mica, 27pF, 500V	155470				
C93 Mica, 27pF, 500V	155470				
D84, 1N4446	480004				
D85, 1N4446	480004				
D86, 1N4446	480004				
D87, 1N4446	480004				
D88, 1N5266, 68V	480018				
D89, 1N4446	480004				
D90, 1N5232	480041				
D91, 1N5232	480041				
D101, 1N4446	480004				
D102, 1N4446	480004				
D103, 1N4446	480004				

1. QTY./UNIT COLUMN INDICATES THE QUANTITY THAT EACH OVERSEAS PLANT SHOULD PROCURE AS RECOMMENDED BY SYSTRON-DONNER.
2. QTY./YEAR AND BUY QUANTITY ARE TO BE FILLED IN OVERSEAS.
3. ORDER FOR SPARES TO BE PLACED WITH CUSTOMER SERVICE.
4. *PRICE INDICATES COST TO S-D OVERSEAS FACILITIES.

Form #1056

SUNNYVALE
DIVISION
SYSTRON DONNER
CORPORATION

735 Palomar Avenue, Sunnyvale, California 94086 USA
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RECOMMENDED SPARES LIST

MODEL NO. 5000 RF Plug
KIT NO. 950213 (A1)

DESCRIPTION	S-D PART NO.	QTY./UNIT	QTY./YEAR	BUY QTY.	PRICE*
D104, 1N4446	480004				
D105, 1N4446	480004				
D106, 1N4446	480004				
D107, 1N4446	480004				
D108, 1N4446	480004				
D109, 1N4446	480004				
D110, 1N4446	480004				
D111, 1N4446	480004				
D112, 1N4446	480004				
D113, 1N4446	480004				
D114, 1N4446	480004				
D115, 1N4446	480004				
D116, 1N4446	480004				
D117, 1N4446	480004				
Q94, IC, LM301A	480655				
Q95, IC, LM301A	480655				
Q96, IC, LM301A	480655				
Q97, 2N4314	485029				
Q98, 2N3440	485007				
Q99, 2N4314	485029				
Q100, 2N3440	485007				

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RECOMMENDED SPARES LIST

MODEL NO. 5000 RF Plug
KIT NO. 950213 (A1)

DESCRIPTION	S-D PART NO.	QTY./UNIT	QTY./YEAR	BUY QTY.	PRICE*
R1, Select at test					
R32, Select at test					
R33, MF, 51K, 1/4W, 2%	471473				
R34, MF, 10K, 1/4W, 2%	471456				
R35, MF, 10K, 1/4W, 2%	471456				
R36, Select at test					
R37, Select at test					
R38, Fxd C, 1M, 1/4W, 10%	475678				
R39, MF, 10K, 1/4W, 2%	471456				
R40, Select at test					
R41, Select at test					
R42, MF, 51K, 1/4W, 2%	471473				
R43, Fxd C, 18K, 2W, 10%	473825				
R44, Fxd C, 18K, 2W, 10%	473825				
R45, MF, 10K, 1/4W, 2%	471456				
R46, MF, 510Ω, 1/2W, 2%	472210				
R47, MF, 820Ω, 1/4W, 2%	471430				
R48, MF, 100K, 1/4W, 2%	471480				
R49, MF, 68K, 1/4W, 2%	471476				
R50, MF, 10K, 1/4W, 2%	471456				
R51, Fxd C, 1M, 1/4W, 10%	475678				
R52, MF, 10K, 1/4W, 2%	471456				
R53, MF, 10K, 1/4W, 2%	471456				

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RECOMMENDED SPARES LIST

MODEL NO. 5000 RF Plug
KIT NO. 950213 (A1)

DESCRIPTION	S-D PART NO.	QTY./UNIT	QTY./YEAR	BUY QTY.	PRICE*
R54, MF, 22K, 1/4W, 2%	471464				
R55, MF, 2.7K, 1/4W, 2%	471442				
R56, MF, 2K, 1/4W, 2%	471439				
R57, Select at test					
R58, MF, 2K, 1/4W, 2%	471439				
R59, Select at test					
R60, Select at test					
R61, MF, 51K, 1/4W, 2%	471473				
R77, Select at test					
R78, Select at test					
R79, MF, 5.1K, 1/4W, 2%	471449				
R101, MF, 51K, 1/4W, 2%	471473				
R102, MF, 51K, 1/4W, 2%	471473				
Q97, Transistor Pad	480752				
Q98, Transistor Pad	480752				
Q99, Transistor Pad	480752				
Q100, Transistor Pad	480752				
TB1, Blank P.C. Board	936159				

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RECOMMENDED SPARES LIST

LEVELER BOARD

MODEL NO. 5000 RF Plug-ins
KIT NO. 950279 (A2)

DESCRIPTION	S-D PART NO.	QTY./UNIT	QTY./YEAR	BUY QTY.	PRICE*
C25, Mylar .01μF, 80V	157002				
C26, Paper Mylar, .01μF, 100V	157101				
C85, Mica, 5 pF, 500V	155460				
C44, Mylar, .01μF, 80V	157002				
C47, Mica 470 pF, 500V	155515				
C49, Mica, 47pF, 500V	155474				
C51, Select at test					
C58, Mylar, .01μF, 80V	157002				
C71, Select at test					
C81, Elect 22 μF, 35V	154002				
C93, Mylar .01μF, 80V	157002				
D28, 1N4446	480004				
D29, 1N4446	480004				
D30, 1N4446	480004				
D31, 1N4446	480004				
D39, Select at test					
D40, Select at test					
D41, 1N4446	480004				
D42, 1N4446	480004				
D61, 1N4446	480004				
D77, Select at test					
D86, 1N4446	480004				
D87, 1N4446	480004				

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RECOMMENDED SPARES LIST

MODEL NO. 5000 RF Plug-ins
KIT NO. 950279 (A2)

LEVELER BOARD

DESCRIPTION	S-D PART NO.	QTY./UNIT	QTY./YEAR	BUY QTY.	PRICE*
D89, 1N4446	480004				
D90, 1N4446	480004				
D94, 1N4830 or STB 568	480010 or				
STB 568	480038				
D95, Select at test					
D96, 1N4446	480004				
Q32, 2N2102	485004				
Q33, 2N2102	485004				
Q34, 2N5087	485040				
Q35, 2N5087	485040				
Q36, 2N2102	485004				
Q37, 2N5087	485040				
Q38, 2N2102	485004				
Q60, 2N4045	485014				
Q62, 2N5087	485040				
Q63, 2N5087	485040				
Q64, 2N2102	485004				
Q97, 2N2102	485004				
HDQ64, Heat Dissipator	480750				
HDQ97, Heat Dissipator	480750				

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RECOMMENDED SPARES LIST

LEVELER BOARD

MODEL NO. 5000 RF Plug-ins
KIT NO. 950279 (A2)

DESCRIPTION	S-D PART NO.	QTY./UNIT	QTY./YEAR	BUY QTY.	PRICE*
R1, Select at test					
R2, MF, 10K, 1/4W, 2%	471456				
R3, MF, 3.3K, 1/4W, 2%	471444				
R4, Select at test					
R5, MF, 100K, 1/4W, 2%	471480				
R6, MF, 33K, 1/4W, 2%	471468				
R7, Select at test					
R8, Select at test					
R9, MF, 390Ω, 1/4W, 2%	471422				
R10, MF, 10K, 1/4W, 2%	471456				
R11, WW, 500, 5W, 5%	477117				
R12, MF, 39K, 1/4W, 2%	471470				
R13, MF, 51K, 1/4W, 2%	471473				
R14, MF, 100K, 1/4W, 2%	471480				
R15, MF, 100K, 1/4W, 2%	471480				
R16, MF, 33K, 1/4W, 2%	471468				
R17, MF, 6.2K, 1/4W, 2%	471451				
R18, MF, 51K, 1/4W, 2%	471473				
R19, Fxd Comp, 1M, 1/4W, 10%	475678				
R20, MF, 10K, 1/4W, 2%	471456				
R21, MF, 1K, 1/4W, 2%	471432				
R22, MF, 10K, 1/4W, 2%	471456				
R23, MF, 10K, 1/4W, 2%	471456				
R24, MF, 10K, 1/4W, 2%	471456				

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CORPORATION

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RECOMMENDED SPARES LIST

LEVELER BOARD

MODEL NO. 5000 RF Plug-ins
KIT NO. 950279 (A2)

DESCRIPTION	S-D PART NO.	QTY./UNIT	QTY./YEAR	BUY QTY.	PRICE*
R27, MF, 15K, 1/4W, 2%	471460				
R43, Select at test					
R46, MF, 5.1K, 1/4W, 2%	471449				
R48, MF, 1K, 1/4W, 2%	471432				
R50, MF, 1K, 1/4W, 2%	471432				
R52, MF, 4.7K, 1/4W, 2%	471448				
R53, MF, 150K, 1/4W, 2%	471484				
R54, MF, 150K, 1/4W, 2%	471484				
R55, MF, 100K, 1/4W, 2%	471480				
R56, Select at test					
R57, MF, 100K, 1/4W, 2%	471480				
R59, MF, 51, 1/4W, 2%	471401				
R65, MF, 1K, 1/4W, 2%	471432				
R66, MF, 270, 1/4W, 2%	471418				
R68, MF, 1.2K, 1/4W, 2%	471434				
R69, Fxd Comp, 2.2M, 1/4W, 10%	475680				
R72, WW, 300, 3W, 5%	477036				
R74, MF, 150K, 1/4W, 2%	471484				
R75, Select at test					
R79, MF, 3.3K, 1/4W, 2%	471444				
R80, MF, 10K, 1/4W, 2%	471456				
R81, not assigned					
R82, Fxd Comp, 5.1, 1/4W, 5%	475105				
R83, Select at test					

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RECOMMENDED SPARES LIST

LEVELER BOARD

MODEL NO. 5000 RF Plug-ins
KIT NO. 950279 (A2)

DESCRIPTION	S-D PART NO.	QTY./UNIT	QTY./YEAR	BUY QTY.	PRICE*
R84, Select at test					
R91, MF, 4.7K, 2/4W, 2%	471448				
R92, MF, 4.7K, 1/4W, 2%	471448				
Q32, Transistor Pad	480752				
Q33, Transistor Pad	480752				
Q36, Transistor Pad	480752				
Q38, Transistor Pad	480752				
Q64, Transistor Pad	480752				
Q97, Transistor Pad	480752				
TB1, Blank P.C. Board	936033				

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CORPORATION

213 786 1760
735 Palomar Avenue, Sunnyvale, California 94086 USA
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676 5000

RECOMMENDED SPARES LIST

MODEL NO. 5000 RF Plug-ins
KIT NO. Chassis

DESCRIPTION	S-D PART NO.	QTY./UNIT	QTY./YEAR	BUY QTY.	PRICE*
D13, 1N4446	480004				
J7, Connector, BNC	210011				
J14, Connector, TNC	210058				
P20, Connector, 24 Pin	210009				
R1, Select at test					
R2, Select at test					
R3, MF, 10K, 1/4W, 2%	471456				
R4, Potentiometer, 10K	479521				
R5, Potentiometer, 10K	479520				
R6, Potentiometer, 10K	479521				
R8, MF, 10K, 1/4W, 2%	471456				
S9, Switch, Toggle SPDT	510026				
S10, Switch, Toggle SPDT	510026				
S11, Switch, Toggle DP3T	510045				
S12, Switch, Toggle SPDT	510026				

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